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ANNUAL REPORT

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Inspector of Mines

OF THE

STATE OF MONTANA

DECEMBER 1, 1900

HELENA, MONTANA:
STATE PUBLISHING COMPANY,
STATE STATIONERS, PRINTERS AND BINDERS,
1901.



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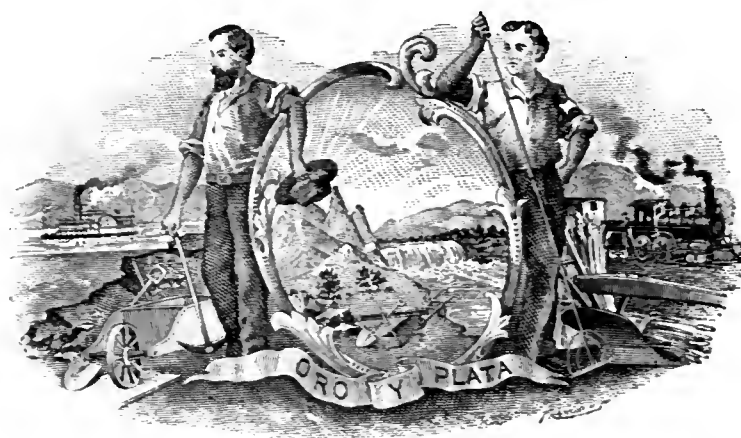
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Annual Report of Inspector of Mines, 1900

Helena, Montana, December 1, 1900.

To Hon. Robert B. Smith, Governor of Montana:

Dear Sir: I beg to transmit you herewith my report together with that of the Deputy State Inspector of Mines for Montana for the year ended November 30, 1900. Very respectfully,

JOHN BYRNE,
State Inspector of Mines.

INTRODUCTION

A quarter of a century ago little was known of the mineral resources of the State of Montana. At that time gold, silver, lead and copper had been discovered, but little had been done in the way of their development other than the securing of gold from the placer deposits and the most superficial prospecting of quartz leads. Much was hoped for in those early days, but the most sanguine never dreamt of such accomplishments as the period since that time has witnessed. The growth of the mineral industry has been little short of fabulous and, while the achievements have been truly marvelous, the industry is only yet in its infancy. Each succeeding year not only reveals new deposits of marketable minerals, but with it also come improved methods for the winning of the treasure from the Bosom of Mother Earth that increases former products and so cheapen them as to permit of competition with the most favored of other countries of the world. Already our copper has dominated the foreign markets, and the keen-sighted capitalists of the Old World, recognizing our superior advantages in the possession of wonderful properties are coming here to take part in the great task of mining and manufacturing so as to be upon an equal footing with the enterprising and vigorous American.

No other state has made such strides in the production of Copper as has Montana. Twenty or twenty-five years is indeed a brief period as compared with the efforts of other copper districts, but it has been long enough to make the name of Montana famous in all lands, and one that must redound to our future growth and even more rapid development.

Few residents of Montana, however, have anything like a proper conception of the greatness of their own state from a mineralogical point of view. Even those who live among the mines would be surprised at the volume of business annually done. They see the train loads of ore going out day after day, but pay little heed to them. They see the corded piles of copper plate and pig being loaded for transportation to market, but they seldom stop to compute the amount of the value.

The total mineral product for 1899, the greatest in its history, reached the enormous sum of \$68,457,307.54, copper of course, coming first with a record of 245,602,214 pounds, which at a value of \$16.75 per hundred, shows an added production of wealth to the amount of \$40,941,905.74; next in value is the production of silver, a considerable quantity of which is a by-product of copper, and this amounted in ounces to 16,850,754.85, having a coinage value of \$21,786,834.52. The gold product for the year amounted to 233,126.717 ounces, with a value of \$4,819,156.95. There were 20,344,750 pounds of lead produced with a value, at \$4.75 of \$909,410.33, the four metals producing the total value quoted, and being an increase over the year preceding of \$17,138,240.39. These figures point the source of Montana's "full dinner pail," and they as well demonstrate that as long as the advance of civilization demands the exclusive use of these metals, conditions may bring periods of depression to other states, but Montana will not feel their detrimental influences.

Copper is now produced in Beaverhead, Deer Lodge, Granite, Jefferson, Madison counties, and Lewis and Clarke and Teton promise to become important in this line, but Silver Bow is distinctly the copper county of the State.

The copper product of the world for 1899 amounted to 468,463 long tons, or 1,049,357,120 pounds, and of this the

United States produced 386,410,356 pounds, which is 37 per cent of the total product, and of this Montana produced 23 1-3 per cent. Of the total product of the United States for the year 1899 Montana produced 245,602,314 pounds, or nearly 61 per cent of the total copper output. This is a wonderful showing for Montana, but it can safely be predicted that her increase of copper output will be both rapid and large from this time on.

Of the total copper product of the state, Butte produced the entire amount except 356,406 pounds, fully justifying that city in calling itself the "Greatest Copper Camp on Earth."

Figuring the gold and silver at their coinage values, and copper at 12 1-2 cents per pound, which is believed to be a fair average price for copper during the above period, the value of the total output of these three metals in Silver Bow County has been

Gold	\$ 13,485,644.80
Silver	169,720,506.11
Copper	292,172,853.00
<hr/>	
Total	\$475,379,003.00

These enormous values have practically originated at Butte, the greater portion of the production having been restricted to a small area, not exceeding two square miles in extent. The mines are in the granite mountain just above the city, and have made Butte the most busy and prosperous place of equal population in the world.

In the mining of its minerals Montana gives employment to a large army of men, while in the collateral industries and associated with the transportation of the product to market thousands of people are employed. The capital invested in the industry is enormous. It is not an easy matter to correctly estimate it because of the many changes constantly taking place.

There is yet a vast territory in the state to be explored and prospected for the marketable minerals. In the copper-bearing formations of the Rockies and branch ranges there are large tracts upon which little in this line has been done.

The rapid growth of the great mining industries demonstrates the enterprise and energy of those whose capital and

energy have in such short time placed Montana in the front rank of mineral producing districts of the world.

While Montana has not the deepest shafts, it has the richest ore and the greatest abundance, and its mines and mills and smelters are equipped with the most modern machinery and every mechanical device of convenience and economy that native or foreign ingenuity can conceive.

During the past two or three years there has been more attention paid to the value of zinc ores and to the study of processes for their profitable treatment. The American Smelting and Refining Co. is now adding a department to its Salt Lake plant, for the treatment of these ores, and plans are now being drawn for a plant of the most approved type for the exclusive treatment of zinc ores that will be in operation in this state in the course of the next year. This is of more than passing importance to the state, as there are several districts within its boundaries where the ores, while carrying good values of the precious metals, and in several instances a large percentage of copper, are temporarily rendered valueless by reason of the high charges made at the smelters in the form of zinc penalties. With the operation of this plant, however, these penalties will disappear and in their stead the zinc will be a value to add to the united worth of the ores. Zinc ores are found in immense quantities in Jefferson county, and the establishment of a plant that will handle its ores will enable that county to come rapidly to the front as a mineral producer. There are a number of mines already opened in this county, such as the Comet, near Boulder, the Alta at Wickes, the Grey Eagle and numbers of others, that have an abundance of this class of ore ready for shipment and are in condition to continue the production for an indefinite period.

Speaking of the complex ores carrying zinc in considerable quantities, and which are excluded from treatment in the ordinary precious metal smelters on account of their choking effects and the fact that they render the slag less fusible and as a consequence retain appreciable quantities of the precious metal values, Benjamin Sadtler calls attention to the fact that they cannot be successfully treated in the ordinary furnace for the distillation of zinc, as they usually contain so

much iron and lead, which corrodes and destroys the retorts. The characteristic zinc product of the precious metal mines is of the variety known as marmatite containing so much iron as a component part that it cannot be separated by any of the usual magnetic processes. Ores treated with the Sadtler process ran, in the raw ore, from 16 to 30.5 per cent iron, 1.5 to 12.89 per cent lead, 2 to 9 per cent silica and 16.5 to 37.5 per cent zinc, silver 5 to 17 ounces, gold \$1.00 to \$11.00. In tests made at the Colorado smelter at Butte the zinc recovery ran from 70 to 84 per cent, a sufficient percentage to justify the assumption that a large and modern zinc furnace, using these retorts, would save the ordinary 85 per cent which is considered a good average result. The cost of the process is simply that of ordinary zinc roasting and distillation plus the cost of from eight to twelve cents each for lining the retorts, and this expenditure is more than off set by the extended life of the retorts.

The profit arising from this class of ores comes from the fact that they can be produced at a lower rate than the pure zinc ores of Missouri and other distinctly zinc districts, because of the gold and silver and other valuable metals contained making it a very profitable product.

The highest wages have always been paid in Montana, and this, together with every modern convenience and safeguard, have attracted the best miners from the mining sections of the world, and these have made a contented and prosperous people who are enjoying the benefits made possible through the activity of these immense properties. The best of schools are open to the youth of our mining districts, and the towns contain fine public libraries, have modern improvements of sanitary and other kinds, and thrift and home adornment is to be seen everywhere.

In my investigations at the mines I have everywhere been courteously received and assisted by those in charge, an assistance that has gone far towards enabling me to properly discharge my official duties with comfort and dispatch, and for this courtesy I beg to return an appropriate acknowledgment to the several managements.

CAGES.

I am pleased to report that the law enacted by the Fifth Legislative Assembly providing for the equipment of hoisting cages with doors or gates to be closed when men are being lowered into or hoisted out of the mines the validity of which was contested in the courts by the Anaconda Copper Mining Co., was sustained by the Supreme Court of the State in a decision handed down on January 29th. Immediately following all shafts coming within the provision of this law were equipped in accordance with it. I surmise that there are yet a few mine officials who are not disposed to view the device contemplated by this statute as one which provides effectually against that character of accidents it is designed to prevent. This idea regarding the efficiency of the contrivance is doubtless due to opinions formed long before it was given a trial, and the hostility manifested against its adoption resulted more from an anticipated inconvenience than from a well-founded objection to its pretensions as a life saving measure. Now that the law is in force, all prejudice against it should cease and no effort should be spared to extract from it whatever of good it may contain by strictly complying with its purpose. Otherwise, the bias of a mine officer may tend to deprive the employes of the protection it affords them by showing a careless or indifferent spirit towards it.

I do not now, nor do I expect to find such a disposition in men having charge of property that is affected by this act who are governed by the best interests of the owners because, next to the miners, the owners are most interested in its observance by reason of the possible liability for damages in case of accident to employes while riding through shafts. The Supreme Court has sustained the law in the following language of Mr. Justice Hunt.

Conviction for violation of section 705 of the Penal Code as amended by an Act of the Fifth Legislative Assembly, entitled "An Act to amend section 705 of Title X of the Penal Code of the State of Montana, to have the cages on all mines cased in." Laws 1897, page 245. After a jury was empanelled and sworn to try the case, defendant moved that it be discharged, upon the ground that the amendatory act cited above is unconstitutional, for the reason that the subject

thereof is not clearly expressed in its title. This motion was overruled and defendant duly excepted. Thereupon the State introduced evidence to sustain the charge. After the State rested defendant sought to prove that the devices called for by the provisions of the amendatory act would not tend to promote the safety of those using the cages to which they were attached, but that, on the contrary, such devices would be dangerous and likely to result in accident. To this offer of evidence the State, by its counsel, objected, and the Court sustained the objection. Defendant duly excepted. The jury convicted the defendant and from a judgment imposing a fine of \$300 defendant appeals.

The amendatory act following the original section (705) of the Penal Code makes it unlawful for "any corporation * * * to sink or work through any vertical shaft where mining cages are used, to a greater depth than three hundred feet, unless said shaft shall be provided with an iron bonneted safety cage."

The most significant change between the original provision of the Code and the statute as amended is that the latter requires cages to be cased in with sheet iron, or steel, or wire netting, and to have doors of the same material, to be hung on hinges or made to slide, and to be at least five feet high from the bottom of the cage; whereas the original statute was silent concerning any such method of construction, thus leaving it optional with the mine operator to encase his cages or not, as he pleased. Evidently, therefore, it was to remove any choice in the matter and to compel the mine operator to adopt an enclosed cage that the amendment of 1897, *supra*, was enacted.

Is the subject contained in the amended bill clearly expressed in the title, as required by section 23, Article V of the State Constitution?

The purposes of the clause of the constitutional mandate that the subject of a bill shall be clearly expressed in its title have been considered and defined by this Court in *State vs. Mitchell*, 17 Montana, *Jobb vs. Meagher county*, 20 Montana, 424, and the authorities cited in these cases. Briefly summarized they are: To restrict the Legislature to the enactment of laws the objects of which the legislators, and the pub-

lic as well, may be advised of, to the end that any who are interested, whether as representatives or those represented, may be intelligently watchful of the course of the pending bill. The limitation is likewise designed to prevent legislators and the people from being misled by false or deceptive titles, and to guard against fraud in legislation by way of incorporating into a law provisions concerning which neither legislators nor the public have had any intimation through the title read or published. (*Commonwealth vs. Brown*, Va., 28 L. R. A., 110.)

But by this constitutional notice it is only intended that the subject of the bill shall be fairly expressed in the title. It is not necessary, for the Constitution has not so declared, that a title shall not embody the exact limitations or qualifications contained in the bill itself which are germane to the purpose of the Legislature, if the general subject of the measure is clearly expressed in the title. Upon the highest authority it is held that, under constitutional provisions substantially like that referred to in Montana, where the degree of particularity necessary to be expressed in the title of a bill is not indicated by the Constitution itself, the courts ought not to "embarrass legislation by technical interpretations based upon mere form or phraseology. The objections should be grave, and the conflict between the statute and the Constitution palpable, before the judiciary should disregard a legislative enactment, upon the sole ground that it embraced more than one subject, or if but one subject, that it was not sufficiently expressed in the title." (*Inhabitants, etc. vs. Ramsdell*, 107 U. S. 155; *Powell vs. Brunswick Co.*, 88 Va. 707.)

In harmony with these sound principles of the construction of like constitutional limitations we are of the opinion that appellant's point is not well taken. We fail to see in the title of this amended bill any substantial departure from the constitutional requirement. That the bill itself contained but one subject is obvious—in fact, we do not understand appellant to contend otherwise. That that one subject, however, is clearly expressed in the bill is disputed, but not convincingly so. The title superficially refers to the section of the Penal Code to be amended, and adds thereto, "to have the cages in

all mines cased in." The law itself requires the cages in all mines to be cased in, if cages are used and if the mines are worked through vertical shafts over three hundred feet in depth, cages if used, need not be such as the law specifies. The law presupposes such a development as leads to the use of cages, and then only undertakes the regulations prescribed.

Now, what was the underlying object of this legislation? Plainly, to better protect the lives and limbs of miners working in developed mines where such development or operation is through vertical shafts in mines where cages are used. There must be a reasonably extensive development three hundred feet in depth before the appliances specified need be used at all; but when such development is had, the law becomes uniform in its operation by requiring that in vertical shafts in all mines so developed where cages are used, the cages must be cased in and covered in a certain way. The legislature, in its wisdom, apparently deemed it unnecessary to require such extraordinary protection in properties where the shafts, though vertical, are less than three hundred feet deep; and we do not assume more than a common knowledge of mining when we state it as a fact, generally known, that in Montana few mining properties operated through vertical shafts are classified by miners as "mines" to be systematically worked until the development exceeds three hundred feet. Clearly, it was never meant to create a statute that would in the least retard the development of prospects by demanding expensive and elaborate means of protection, unnecessary while prospecting or shallow mining only was going on.

As stated, the aim of the legislature was to insure a proper protection for miners where a prospect has opened into a "mine," in which deep mining is to be carried on, and the enterprise has taken on some degree of permanency of operation, for, obviously, it is in deep mining that the protection is most needed.

Though the words of the title "to have the cages in all mines cased in." are general, they give clear notice to the operators of all mines where cages are used that their properties might be affected by the law. There was no deception by design or accident, and we cannot see how on the one hand any mine owner operating a mine where cages are used

could fairly say that he was misled, or on the other a mine owner not using cages at all in his mine could have been deceived by the title.

There is, therefore, really no objection to the law other than that the title is somewhat broader than the bill itself. The effect of the comprehensiveness, however, is not reasonably to mislead or deceive. A better title than the one given, a more limited title, could be suggested; still we think, under the doctrines of construction already invoked, the subject contained in the law is expressed by the title used, with sufficient clearness to remove the Act from within the mischief which the Constitution says shall be avoided. It follows that the Court cannot hold the law as unconstitutional. In line with our views we cite: *Neuendorff vs. Duryea et al.*, 69 N. Y. 557; *State vs. Trolson*, (Nev.) 32 Pac. Rep. 930; *State vs. Miller*, 45 Mo. 495; *Sutherland on Stat. Construction*, Sec. 97; *Cooley's Const. Limitations*, page 170, et seq.; *Alleghany Co. Homes Appeal*, 77 Pa. St. 77; *State vs. Becker*, (S. Dak.) 51 N. W. 1018; *Matter of Petition of Mayor*, 50 N. Y. 504; *Luther vs. Saylor*, 8 Mo. App. 424.

The contention that the Court erred in excluding evidence offered to show that the devices or cages required by the amended law would be dangerous and apt to result in accidents must fall also. The text of the law discloses a measure designed to guard against the dangers incident to lowering and elevating men in deep mining shafts. Whether the cased-in cage and its appliances is the best or wisest method was a question for the Legislature to decide. Laws regulating the construction and operation of elevators are frequently enacted as a proper exercise of the police power of the State. The Legislature is the branch of the government which exercises this power, and unless there be constitutional limitations upon it, as a rule, the judicial power cannot set aside a law passed in the exercise of it. This proposition is fundamental. Whether the courts may nullify the judgment of the Legislature upon the ground that some great principle of natural right has been subverted is a question not before us, for a law requiring mining cages to be covered and cased in does not present an instance of "natural injustice" which authorizes

the interposition of the courts, even could there be such interposition, under the guaranty that no man shall be deprived of life, liberty or property without due process of law."

ACCIDENTS.

During the year 47 fatal accidents occurred, 40 of which were in the metal mines and seven in the coal mines. Investigation into the various causes from which these deaths resulted shows that at least half of them could have been avoided by the exercise of ordinary prudence on the part of the deceased. A fair proportion of the others were no doubt unavoidable. To the indifferent methods and contempt of an organized and regulated system of operations on the part of some managements may justly be attributed the remainder of the fatalities. As a matter of fact, all our large mines are provided quite generously with the means necessary to make safe conditions and provide against accident, but of what use are they unless their use is systematically insisted on by those in authority. For instance, after a fall of rock has occurred in a stope or drift killing or injuring one or more of the miners, the place is visited by the Superintendent or Foreman who makes a thorough examination of the conditions and in the great majority of instances will order the place permanently timbered if sufficient ground is out to allow of it being done; and if not, then order that timbers of a temporary character be set up until room is made for the permanent sets. Now, it often happens that some one of the mine officials has passed through that place a short time prior to the accident and after a superficial examination, went on his way oblivious to pending danger, and is greatly astonished when he learns of what has occurred, the thought never presenting itself that he is in any way responsible; and even after the scene of disaster has been visited by the higher officials and orders issued then which if given in the first place, would have saved a life or prevented an injury. The apparent dereliction of duty passes unnoticed they usually excusing themselves with the expression that "The men should know enough to take care of themselves." This idea is only partly

right, and only so far as it is right, do I approve of it; but before adopting it as a rule of practice, I would suggest that in selecting men to conduct the affairs of our large mines only those be chosen who are capable of hiring men having such qualifications, or possessing judgment sufficient to determine within a reasonable time whether the employes have the ability to properly take care of themselves without advice or instruction from those in charge.

One of the chief causes of accidents in the large mines and the one tending most to nullify the best intended plans of the owners for the protection of the miners is the lack of a uniform policy of administration and diversity of purposes sought to be accomplished between the Superintendent and Foreman on the one hand and the Shift Bosses on the other. The Superintendent and Foreman as a rule try not to lose sight of the condition of the mine while bending every effort to secure the best results in production; yet, the shift boss is animated solely by a desire to mine and hoist the greatest possible tonnage regardless, to a great extent, of the conditions as to timbering, etc., of the working places, and as a rule a rivalry exists between the bosses on respective shifts, each trying to add to his reputation by hoisting more tons than the "other fellow." The effect of such methods tend naturally to increase the hazard of the miner and cannot even be justified as profiting the owner because it is destructive of his best interests.

An earnest effort has been made by this department to improve the methods of storing and thawing powder underground. Every wooden box and every apparatus constructed of wood in which the heat was furnished by a candle, found doing duty as a thawing device was condemned and an apparatus made of some metallic substance constructed to furnish the required heat by hot water contained within it was recommended. Of the sixteen fatal accidents resulting from explosions none is chargeable to explosions from magazines or thawing devices. The following summary shows the causes of accidents:

Exposion of blasting compounds	16
Falls of rock	10
Falling coal	2
By cages in shafts	6
Falling down shaft	3
Falling down upraise	1
Falling from bucket while being hoisted	2
Falling down ore chute	1
Suffocated by powder gas	3
Material falling down shaft	1
Crushed by mine car	2
Total	47

The following letter and notice was sent to mine managers in Silver Bow County during the year in the hope of preventing a class of accidents that in our humble judgment was of too frequent occurrence:

"A careful consideration of the various causes of accidents in the mines of Silver Bow County shows such a large percentage occurring to miners engaged in stoping out ground as to convince anyone that the methods only too often practiced of carrying and working stopes so close to each other is unnecessarily dangerous. A familiarity with the conditions existing in the mines of Silver Bow County and with the effect that the drilling of holes and blasting of same in the upper stopes has on the roof of the stopes immediately below them, (when such stopes are close together), convinces me that a regulation providing for a specified distance between stopes is necessary to produce a condition for the mine employes which may be considered reasonably safe. The regulations provided for in the official notice handed you herewith are not unreasonable and a compliance therewith can neither cause an inconvenience nor work a hardship to the mine management."

(Signed by Inspector of Mines.)

"Let this serve as a notification that on and after this date where several stopes are being worked one above another, in any mine in the district of Silver Bow County, and being driven and worked with less than twenty-five (25 feet) of timbered ground between each and every stope, said stopes

shall be considered in a dangerous condition and are hereby forbidden under the authority vested in me by sections 584 and 585 of the Political Code of the State of Montana.”

(Signed by Inspector of Mines.)

RECOMMENDATIONS.

The coal mining industry of the State has developed sufficiently both in the number of mines and the men engaged in them to justify a larger share of attention from this department than is possible with the present force. Besides an increase in the number of mines the workings of those that have been in operation for a number of years past have become very extensive, several of them aggregating a length of from 20 to 30 miles in haulage roads, entries, air courses, and rooms. The ventilation, so essential to the coal miner, and proper maintenance of such vast systems of workings should be given the attention their importance demands by the state. Quarterly inspections should be made by a competent officer who would at all times effectually apply the laws and regulations governing coal mines. In order to provide this urgent need I urgently recommend that the present law be amended by providing two deputies for this department, one of whom shall be a qualified coal miner.

I would recommend the amendment of H. B. No. 17, Session Laws of 1897, which provides for an opening independent to the main working shaft or incline, so as to make its main provisions applicable to all mines which are worked through a tunnel or adit opening, and prohibiting the erection of any but a fire proof building within 30 feet of all drift or tunnel entrances which have no escapement outlet.

Section 705, Penal Code, providing for safety apparatus, in so far as it relates to safety cages, when a greater depth than 300 feet has been attained, is very defective and should be remedied. The change I would suggest would make the law read as follows:

“Section 705. It is unlawful for any corporation or person to sink or work through any vertical shaft, or any incline shaft, having an inclination of 70 degrees or more, to a greater depth than 300 feet, unless said shaft shall be pro-

vided with a cage or skip, said cage or skip to be provided with an iron bonnet and safety catches, to be used in the lowering and hoisting of employes thereof, said cage to be also provided, etc., as the remaining part of the section provides.

The rate of speed at which employes are lowered into and hoisted out of shafts should be regulated by law. The maximum rate should not exceed 700 feet per minute, except in shafts where the cages are provided with doors, when a rate of 800 feet per minute may be safely allowed.

The danger arising from poorly constructed cross-heads and from those of short length calls for their regulation by providing that cross-heads shall not be less than six feet in length and providing a penalty for making crossheads of less length.

Prohibiting stoping up to a shaft and providing for a pillar to be left that will insure the safety of the shaft and providing for a penalty for a violation of this rule.

Productions of gold, silver and copper in Montana from 1882 to 1899, inclusive:

	GOLD. Fine ounces.	SILVER. Fine ounces.	COPPER. Fine pounds.
1882	12,093.750	2,699,296.38	9,058,284
1883	14,560.875	3,480,468.75	24,664,346
1884	21,776.006	4,481,180.36	43,093,054
1885	13,838.297	4,126,677.60	67,797,864
1886	31,223.450	5,924,180.38	57,611,485
1887	48,175.743	6,958,822.92	78,700,000
1888	44,320.062	8,275,768.87	98,504,000
1889	31,652.325	6,560,038.75	104,589,000
1890	25,704.730	7,500,000.00	112,700,000
1891	29,395.356	7,985,089.77	112,383,420
1892	36,222.560	8,311,130.82	158,413,284
1893	33,807.877	6,668,730.16	159,875,490
1894	36,768.015	7,561,124.46	185,194,385
1895	41,493.363	10,051,760.52	197,190,650
1896	59,815.755	11,120,731.78	228,886,962
1897	54,198.037	10,710,815.45	236,826,597
1898	55,038.589	8,996,555.01	216,648,077
1899	62,038.377	9,855,831.97	245,245,908
Total	652,368.167	131,268,203.95	2,337,382,824

Total Production of Precious Metals in Montana During Calendar Year 1899.

Description	Quantity	Value
Gold, fine ounces.....	233,126.717	\$ 4,819,156.95
Silver, fine ounces (coining value).....	16,850,754.85	21,786,834.52
Copper, fine pounds, at \$16.67 per hundredweight.....	245,602,314	40,941,905.74
Lead, fine pounds, at \$4.47 per hundredweight.....	20,344,750	909,410.33
Total.....		\$ 68,457,307.54

Production of Gold, Silver, Copper and Lead in the State of Montana From the Year 1862 to 1899, Inclusive.

Year	Gold	Silver ¹	Copper	Lead	Totals	Yearly Increase
						Per Cent
1862 to 1881, inclusive ²	\$ 200,000,000	\$ 11,000,000			\$ 211,000,000	
1882.....	2,550,000	4,370,000	\$ 1,539,860		8,459,860	
1883.....	1,800,000	6,000,000	3,452,960	\$ 226,424	11,479,384	37½
1884.....	2,170,000	7,000,000	5,386,500	246,326	14,802,826	31
1885.....	3,400,000	11,500,000	6,779,800	274,350	21,954,150	50
1886.....	4,442,000	13,849,000	5,761,200	494,132	24,526,332	12
1887.....	5,978,536	17,817,548	8,853,750	607,662	33,257,496	35½
1888.....	4,200,253	15,790,736	15,103,946	569,160	35,664,095	7½
1889.....	3,500,000	19,393,929	13,334,970	436,975	36,685,884	3
1890.....	3,300,000	20,363,436	16,656,437	675,392	40,995,465	11½
1891.....	2,890,000	20,139,394	14,377,336	1,229,027	38,635,757	5½
1892.....	2,891,386	22,432,323	19,105,464	990,035	45,419,208	18
1893.....	3,576,000	21,855,780	16,630,958	964,089	43,029,827	5
1894.....	3,651,410	16,575,458	17,333,718	730,551	38,191,137	11
1895.....	4,327,040	22,886,992	21,114,869	754,360	49,083,261	28½
1896.....	4,380,671	20,324,877	25,356,541	670,010	50,732,099	3½
1897.....	4,496,431	21,730,710	26,798,915	928,619	53,954,675	6
1898.....	5,247,913	19,159,482	26,102,616	809,056	51,319,067	5
1899.....	4,819,157	21,786,835	40,941,906	909,410	68,457,308	33
Total	\$ 267,600,797	\$ 313,979,710	\$ 284,531,746	\$ 11,535,578	\$ 877,647,831	

¹ Coining rate. ² No annual compilations were made prior to 1881. ³ Decrease.

BRICK AND CLAY.

Production of Brick and Clay, as reported by Fred D. Smith, Director Montana Geological Survey, year 1899:

Brick, common	18,140 M.	\$115,775 00
Brick, front	559 M.	5,590 00
Brick, fire, alumina	1,022 M.	42,208 10
Brick, fire, silica	865 M.	30,825 60
Brick, paving	350 M.	4,200 00
Sewer pipe and drain tile	38,000 Ft.	9,500 00
Hollow blocks, 8x8x4 inches	250 M.	5,750 00
Fire clay for smelters	1,000 Tons	1,200 00
Miscellaneous		1,000 00
Total value		\$445,776.68

PRODUCTION OF STONE.

Sandstone, building	183,200 cu. ft.	\$26,050 00
Sandstone, R. R. embankments	7,500 cu. yds.	12,750 00
Granite, bldg. monumental, etc.	10,476 cu. ft.	10,022 00
Marble, monumental	200 cu. ft.	1,000 00
Silica flux for smelters	3,600 tons	2,160 00
Limestone	48,000 tons	26,400 00
Total		<u>\$78,382 00</u>

SUMMARY.

A summary of the value of the products investigated by the Director of the Montana Geological Survey for 1899 is as follows:

Coal	1,419,831.83 tons	2,228,531 13
Coke	50,072.20 tons	401,778 72
Brick, clay, etc.		216,046 70
Stone, bldg. ornamental, fluxes		78,382 00
Lime	95,987 bush.	21,897 00
Total		<u>\$2,946,635 55</u>

OPERATING MINES IN MONTANA HAVING A DEPTH
OF 500 FEET OR MORE.

Name of Mine.	Depth.
Anaconda	1,800
St. Lawrence	1,600
Never Sweat	2,000
High Ore	2,200
Bell	1,650
Diamond	2,200
Green Mountain	2,200
Mountain Con. No. 1.	2,000
Mountain Con. No. 2.	1,500
Buffalo	1,600
Little Minah	800

Parrot	1,600
Moonlight	1,300
Pennsylvania	1,400
Mountain View	1,700
Leonard	1,200
West Colusa	1,300
East Colusa	900
Gagnon	1,800
Silver Bow No. 1	1,000
Silver Bow No. 3	575
East Grey Rock	1,600
Blue Jay	1,075
Berkeley	900
Colusa-Parrot	1,400
Stewart	1,000
Original	1,200
Rarus	1,200
Nipper	800
Minnie Healey	800
Alice	1,500
Blue Wing	650
Magna Charta	700
Ella	500
Speculator	1,200
Drumlummon	1,600
Mayflower	980
Kennet	600
Granite	1,600
Bi-Metallic	1,700
Hope	550
North Pacific	550
Carbon Coal Co.	900
Eva May	600

The following exhibits the number of mines inspected, the number of men employed and the number of fatal and non-fatal accidents during the past eight years:

Year	Mines Inspected	Men Employed	Fatal Accidents	Non-Fatal Accidents	Total Accidents	No. of Fatal Accidents Per 1,000 Men Employed
1893.....	56	5,312	29	4	33	5.45
1894.....	78	7,082	27	19	46	3.81
1895.....	88	8,758	41	18	59	4.67
1896.....	78	7,727	64	21	85	8.28
1897.....	130	9,825	52	29	81	5.29
1898.....	136	11,096	48	29	77	4.32
1899.....	165	12,316	49	22	71	3.97
1900.....	163	13,996	47	35	82	3.36

1899	Name	County	Name of Mine
Dec. 6.....	John Kiely.....	Silver Bow.....	Diamond.....
16.....	Thomas Martin.....	Cascade.....	A. C. M. Co., Belt.....
17.....	Michael Driscoll.....	Silver Bow.....	Never Sweat.....
24.....	Pat Joyce.....	Silver Bow.....	St. Lawrence.....
30.....	Ed. Perrow.....	Silver Bow.....	Parrot.....
1900			
Jan. 6.....	Thomas Bilbow.....	Silver Bow.....	Never Sweat.....
6.....	Mike Piano.....	Silver Bow.....	Never Sweat.....
13.....	Thomas Smith.....	Silver Bow.....	Mountain Con. No. 1.....
13.....	Mike Sullivan.....	Silver Bow.....	Mountain Con. No. 1.....
14.....	Fred Buslett.....	Cascade.....	A. C. M. Co., Belt.....
14.....	J. H. Maxwell.....	Cascade.....	Colusa-Parrot.....
14.....	J. Milonovich.....	Cascade.....	Colusa-Parrot.....
Feb. 3.....	John Brown.....	Madison.....	Clipper.....
3.....	J. Gries.....	Madison.....	Clipper.....
14.....	B. Wilkins.....	Carbon.....	Gebo.....
16.....	D. H. Brooks.....	Carbon.....	Bridger.....
22.....	Henry Jeffery.....	Silver Bow.....	Moose.....
23.....	Milton Keller.....	Silver Bow.....	Moonlight.....
Mar. 24.....	Jerry Murphy.....	Silver Bow.....	Parrot.....
Apr. 6.....	James Lewis.....	Park.....	Sowash.....
23.....	Nelson Leclaire.....	Granite.....	Granite Bi-Metallic.....
28.....	Nelson Larson.....	Fergus.....	Iron Chancellor.....
May 13.....	Ole Mohlstad.....	Lewis & Clarke.....	Bald Mountain.....
June 10.....	Ed. Fogarty.....	Silver Bow.....	Never Sweat.....
11.....	Ed. Cavanaugh.....	Silver Bow.....	Mountain Con. No. 1.....
14.....	P. C. Duncan.....	Silver Bow.....	Gagnon.....
27.....	Ed. Young.....	Silver Bow.....	Original.....
July 19.....	M. L. Dunlevy.....	Silver Bow.....	Anaconda.....
24.....	Thomas Cashion.....	Silver Bow.....	High Ore.....
Aug. 3.....	Thomas W. Thomas.....	Park.....	Montana Coal & Coke Co.....
4.....	Pat Murphy.....	Silver Bow.....	Diamond.....
Sept. 14.....	John Kelly.....	Silver Bow.....	Stewart.....
14.....	J. J. Murray.....	Silver Bow.....	Stewart.....
25.....	O. Anderson.....	Gallatin.....	Mountain Side.....
28.....	J. W. Slater.....	Jefferson.....	Eva May.....
Oct. 1.....	Ber. McDonald.....	Silver Bow.....	Smokehouse.....
11.....	S. L. Fuller.....	Silver Bow.....	Old Joe.....
13.....	James Gayler.....	Madison.....	Kennet.....
14.....	Dan Buckley.....	Silver Bow.....	Diamond.....
29.....	J. T. Drummey.....	Silver Bow.....	Rose.....
29.....	W. C. Whitmore.....	Silver Bow.....	Smokehouse.....
29.....	Chas. Blackie.....	Silver Bow.....	Smokehouse.....
29.....	Robt. Campbell.....	Silver Bow.....	Smokehouse.....
29.....	Thomas Glendennon.....	Lewis and Clarke.....	Lucky Joe.....
30.....	Guiseippe Morello.....	Silver Bow.....	B. & M. Shaft No. 5.....
Nov. 3.....	Joseph Delhanty.....	Cascade.....	Cottonwood Coal Co.....
18.....	John Eagan.....	Madison.....	Strawberry.....

MAYFLOWER.

The Mayflower mine is located 10 miles from Whitehall, owned and operated by the Mayflower Mining Co.; B. C. Leyson, Superintendent and John Stafford, Foreman. Since the last published report in 1898, a new 40-horse power engine has been installed and the shaft lowered from the 300 foot level to 700 feet, making a total depth from the outcrop of 980 feet. The shaft is equipped with a single deck cage provided with safety catches gates and one inch round steel wire rope. The chief product is gold, silver being in an unimportant quantity. Perhaps the most notable feature in connection with the ledge is the uniformity of values contained within its productive area. Every foot mined from the grass roots to the present depth, within the boundaries which are being attacked, have produced high grade ore. The safety and health of the men is carefully looked after. An outlet for escape in case of emergency is provided, ventilation is excellent and wherever it is required the stopes and workings are well timbered. Thirty men find steady employment.

WEST MAYFLOWER.

The West Mayflower is owned and operated by the West Mayflower Mining Co. Postoffice address, Whitehall, Montana. Mr. B. C. Leyson is Superintendent. The mine is developed by a tunnel 1,500 feet in length from which numerous crosscuts have been made and drifts paralleling the main tunnel have been driven with the object of exposing the vein thoroughly. A shaft 300 feet deep and two compartment, is sunk on the main ore body. One hundred and forty feet of this depth has been sunk this year. A 22-horse power Fairbanks & Morse gasoline engine has been in constant operation for about two years which, besides hoisting all the material from the stopes and workings of which the shaft is the outlet, runs a compressor capable of supplying power for one drilling machine. The other equipment consists of a 3-4-inch steel wire rope and bucket. Two outlets are maintained as a safeguard against fire. The mine is well ventilated and reasonable provision made for the safety of the men employed. The working force consists of 10 men.

BOWERY.

The Bowery is owned by F. R. Merk, operated under bond by the Bowery Mining Co., and located near Silver Star. Mr. John N. Glass, Manager. Development is carried on through a shaft 450 feet deep, 100 feet of which was sunk this year. A tunnel 1,000 feet long has been run from the north side of the hill and connects with the shaft at the 400 foot level. The hoisting plant consists of a Kendall engine 8x10 cylinder, 3-4 inch cable and skip. The walls are supported by stulls and the excavation afterward filled with waste material. Ventilation is very good and exits are numerous. Twenty men are employed. This property was operated in the years 1898 and 1899 by Mr. John Berkin, during which period the earnings were solely derived from a grade of ore carrying values sufficient to bear the cost of a 22 mile wagon haul, railway transportation from Whitehall to Butte or Helena and smelting charges. In the early part of the present year a company was organized by Mr. Berkin with a view to developing the property thoroughly and equipping it to treat on the ground those classes of ores which will not bear transportation and smelting charges. In furtherance of these plans and in order to avoid the possibility of error in determining the selection of process best adapted to the reduction of the ore, a 20-ton combination stamp and cyanide mill has been erected and the ore subjected to thorough tests by that process. The percentage of recovery by the method and cost have proven so satisfactory that a plant of large tonnage is contemplated in the near future. In the mean time the work of developing the ore bodies is steadily progressing.

WATSEKA.

The Watseka is located at Rochester, owned by the Watseka Mining Co. Carl H. Hand, Manager, S. C. McClure, Superintendent. There is a three compartment shaft 185 feet deep sunk on the property, equipped with a 75-horse power Ottumwa engine, 1 inch cable and safety cage, all of which are regularly examined and tested. All other conditions by which the lives and health of the men employed are affected, as timbering, ventilation, means of egress and care of explosives, re-

ceive careful consideration at the hands of the management. Seventy men are employed in and around the mine. This mine has worked intermittently for many years in the course of which considerable gold has been extracted both by the original owners and others who have leased it from time to time. The work done previous to the transfer of the property to the present owners, was chiefly confined to extracting the high grade ores above water level. Several unsuccessful attempts were made to develop the vein below that point, the failure being due to the heavy and persistent flow of water encountered. The present owners were obliged to make large expenditures for pumping machinery and power plant in order to meet and overcome the difficulty connected with sinking a shaft and handling a large volume of water at the same time. The vein is developed for a length of 500 feet and in the course of this distance a considerable amount of shipping ore has been uncovered as well as large bodies of profitable milling quartz. The mill formerly owned by the Thistle Mining Co. was purchased by the Watseka Company the past summer. Alterations and improvements were made and appliances added to suit the character of the product.

EASTERN.

The Eastern is located eight miles from Virginia City, owned by Henry Elling. W. F. Musser, Superintendent. Employs 35 men. Development consists of a two compartment shaft 350 feet deep on which is installed a 50-horse power engine, 7-8 inch round cable and safety cage. The shaft has not been operated for some time, effort being directed to that part of the vein which favored development by tunnels of which there are three in use, all driven on the vein. Their respective lengths are: No. 2, 800 feet; No. 3, 2,300 feet; No. 4, 1,900 feet. Nos. 2 and 3 are connected by an upraise which serves for ventilation and affords a means of escape from fire and other sources of danger. Excepting the levels, chutes and manways little timber is used in the mine, sufficient lean material being mined in connection with the pay ore to fill the stopes and sustain the walls. The fissure is a remarkable fine one, its width varying from two to fifteen feet

and its length yet remains undetermined. Gold and silver are the metals contained in the quartz. The bulk of the product is treated by concentration on the ground by a 30-ton mill constantly running full capacity. The first grade ore is shipped direct to the smelter.

PACIFIC.

The Pacific is located nine miles from Virginia City, owned and operated by Henry Elling. W. F. Musser, Superintendent. Employs six miners. Produces gold and silver. This is a new and very promising ledge that is being developed by Mr. Elling. A tunnel 2,000 feet in length is being driven on the vein, developing extensive bodies of profitable milling ore.

KENNET.

The Kennet is located five miles from Virginia City, owned by W. B. Millard. V. B. Sabin, Superintendent. Employs 50 men. A two compartment shaft 600 feet deep, 12x12 Fraser & Chalmers engine, 3-4-inch cable and cage are used in hoisting the product to the surface. Ventilation is fair. Some difficulty was experienced in former years respecting the timbering as also for the lack of it. This year quite an improvement is noted in that direction. There is a second opening from the 200 foot level to the surface connection with the deeper levels not yet being completed. Thirty of the sixty stamps were kept working during the greater part of the year. The mill is situated 4 1-2 miles from the mine. This is a serious disadvantage to economical operation as it entails a large expense in transporting the product. The development carried on during the year has largely increased the visible supply of ore, and should it pay even a small profit above mining and milling, the aggregate would justify a large investment by reason of the large tonnage the property is capable of producing.

RED BLUFF.

The Red Bluff is located at Red Bluff, owned and operated by the Red Bluff Gold Mining Co. G. D. B. Turner, Manager.

Griffith Jones, Foreman. The shaft was lowered during the year from the 200 foot to the 300 foot level. The upper part of the shaft is two compartment and the lower enlarged to three compartment. The shaft is equipped with a 30-horse power engine, 7-8-inch cable and bucket. A second outlet is provided for escapement and the whole is well ventilated. The ore carries gold chiefly and a little silver and lead. Thirty men are employed. Much difficulty was experienced in the re-opening of this old mine, it having lain idle for years, and though considered a safe venture by those most familiar with its record, the cost entailed for a necessarily large plant, pumping and hoisting machinery, besides that of putting the mine in shape for deeper work, deterred conservative mining men and capitalists seeking investment in mines from undertaking its development. In 1899 the ledge was examined by its present manager, Mr. Turner, through whose efforts foreign capital has been enlisted and the development of the mine has been proceeding most satisfactorily. The vein is a large, clean cut, persistent fissure, a good part of the product carrying high values. The company intend building a concentrator for the treatment of the inferior ores.

MADISONIAN.

The Madisonian is located nine miles from Norris. E. H. Trerise, Manager. C. J. Trerise, Superintendent. Eighty men find employment. The main opening is an incline shaft 350 feet deep, 100 feet of which was sunk this year. A 25-horse power engine, 3-4-inch cable and self-dumping skip make up the hoisting plant. Half sets and stulls is the method of timbering adopted. Ventilation is excellent and a manway separate from the main shaft is maintained as a provision against unforeseen dangers. Precautions are exercised against disastrous explosions both by limiting the quantity of powder allowed underground to 24 hours' supply and by providing the most approved thawing apparatus. While sunk only to the 250 foot level by the former owners and only 300 feet of drifting has been done on the ledge, yet it is one of the earliest quartz discoveries made in the southern part of the state. More than 20 years ago a stamp mill was operated on the quartz mined

from this ledge but with indifferent success, and as depth was gained changes occurred in the character of the ore increasing the difficulty of recovering the values by the method then employed. During the early part of 1899 Mr. F. B. Turner and others bonded the property and erected a 60-ton combination cyanide and concentration mill and resumed operations, they later transferring the property to Mr. L. Z. Leiter of Chicago. Under the energetic management of Mr. E. H. Trerise development is being actively prosecuted in all directions. The older parts of the mine have yielded a considerable quantity of good ore and in the newly opened sections large bodies of pay quartz have been struck. The success met with in the recent development assures a long period of prosperity for the property.

CLIPPER AND BOSS TWEED GROUP.

This group is located three miles from Pony, owned by Morris & Elling. W. W. Morris, Manager. James Wilkie, Foreman. Employs 15 men. These veins are developed by tunnels. The main working vein of the Clipper is 1,800 feet in length; that of the Boss Tweed, 1,300, and are parallel to each other, being connected by crosscuts at several points. Connection is also maintained between the main Clipper tunnel and one further up the mountain thus insuring a plentiful supply of pure air. The walls are extremely hard requiring but little timber to support them. Powder is safely stored and the method of treating the supply for immediate use the safest devised. Perhaps the most important strike of gold-bearing rock made during the year was the discovery of an immense body of gold-bearing milling rock in the Boss Tweed. While not of a high grade character the entire mass will pay handsomely to mill. The width varies from 25 to 95 feet and is several hundred feet in length. A depth of 1,200 feet is attained along the dip of the vein from the outcrop to the point where this body of ore was developed, which is a very encouraging circumstance as regards the future of deep mining in that district. Negotiations are under way looking to a sale of this group to an English syndicate which, if successful, means the installation of a milling plant second to none in the state in

point of capacity. At the present time a mill of 20 stamps and four vanners is kept running constantly.

RED CHIEF MINE.

The Red Chief is located near Red Bluff, operated by the Red Chief Mining Co. There is a two compartment shaft on this property which was sunk some years ago but work was suspended for want of facilities to treat the product. It is now being operated in conjunction with the Water lode. The present owners are hopeful of success as they are prepared to handle at a profit a class of ore that is worthless except to those owning a concentrating plant. It is proposed to push the development on the mines and run the concentrator on the ores already developed in the upper workings, enlarging the concentrator if justified by future discoveries. The value found in this mine is gold. Fifteen men are employed.

WATER LODE.

The Water Lode mine is located at Red Bluff, operated by the Red Chief Mining Co. C. L. Sherman, Manager. This property is developed through an incline shaft 180 feet deep. and hoisting plant consists of an 8x10 Lidgerwood engine, 5-8-inch round rope and bucket. Fifteen men are employed. The ore carries gold and silver. There being but one opening, notice was served to make an escapement outlet, work to commence on it from that time and be diligently prosecuted until completed. Ventilation was not up to the requirements necessary to preserve the health of the employees. The improvement of the property also depending upon an upraise being put through to the surface. Regular shipments of ore have been made during the past two years. A company composed of eastern capitalists has been organized to work this and several adjoining claims. A 50-ton concentrator has been erected to reduce the low grade product.

STRAWBERRY GROUP.

This group is located 2 1-2 miles from Pony, owned by Morris and operated under bond by the Salt Lake Mining and

Development Co. John F. Cowan, Manager. Charles Stewart, Foreman. Employs 20 men. This group is developed by two tunnels, No. 1 being driven 200 feet and No 2 600 feet. The ledge is gold bearing. An upraise has been made between the tunnels which provides an ample supply of pure air for all the workings. The stopes are securely timbered and the conditions which effect the security of the miners leaves no room for complaint. A 10-stamp mill with the addition of three concentrating tables has been erected and running for three months, and the property bids fair to become a substantial producer.

CHILI.

The Chili mine is located at Sand Creek, operated by the Badger Butte Mining Co. L. J. Browning, Manager. Oscar Bell, Foreman. The working force consists of twenty men. A double compartment shaft 200 feet deep, equipped with 9x10 Lidgerwood engine, 7-8 inch cable, bucket and cross-head. The former operators allowed the escapement shaft to cave between the 100 and surface. Notice was served to have it reopened and put in good condition for a manway. Excepting in this particular the mine is in a very safe condition. The vein is a very regular fissure and produces considerable high grade gold ore. A 5-stamp mill and two vanners is run in connection with the mine.

GALENA.

The Galena mine is located 2 1-2 miles from Pony, owned by the Garnet Gold Mining Co. C. H. Wood, Manager. Ten men are employed underground and five on surface. Work is carried on through two tunnels of a length of 800 and 900 feet respectively. Ventilation is good and a connection is maintained between the two tunnels for emergency purposes. The openings and excavations are well timbered with square and tunnels sets. A mill of 20 stamps and vanners owned by the Company concentrates the ore into a shipping product. Gold, silver and copper are the metals contained.

MONITOR AND REVENUE.

This property is located on Richmond Flat. R. C. Knox, Manager. These mines adjoin and a portion of their productive ground was tied up during the year owing to contentions as to their respective rights. Matters have since been mutually adjusted and the properties are now operated as a joint concern, both claims being worked through the Monitor shaft which is 160 feet deep, equipped with whim, bucket and 5-8 inch cable. Air in plentiful volume is supplied and the workings safely timbered. Several manways lead from the workings to the surface. These claims produce a liberal quantity of high class gold ore which is shipped to the smelter for treatment. The less valuable grades are reduced in a cyanide mill of 50 tons capacity, owned by the Revenue Company.

OLD JOE.

The Old Joe, situated three miles from Pony, owned by Nelson & Renhold, has two tunnels; No. 1 200 and No. 3 400 feet long. The Salt Lake Mining and Development Company did considerable work on this ledge during the year but owing to the refractory character of the ore and distance from smelting points, were obliged to suspend operations. The ore carries gold, silver, copper and lead.

MONTANA MINING COMPANY, LIMITED.

The Montana Mining Company's mines are located at Marysville. Alex. Burrell, General Manager. Wm. Philpotts, Superintendent. One hundred and twenty-five men are employed in the mines and works. The main shaft of the Drumlummon lode is 1,600 feet deep, sunk on an angle of 70 degrees and three compartments. A powerful hoisting engine of the direct, first-motion type, $\frac{1}{2}$ x6-inch cable and single check cages comprise the hoisting plant. The management displays a most commendable spirit in the provisions made and the personal interest taken in the safety and welfare of its employes. There is also a shaft on the Nine Hour Claim which, with its winze continuations, prospects that claim to a depth of 1,300 feet. The Company owns two stamp mills of 50 and 60 stamps

respectively which are designed to treat different classes of ores. The 60 stamps were operated the greater part of the year and a part of the 50 stamps were run periodically. This Company also owns and operates the largest cyanide plant in the state, its daily capacity being 400 tons. It was erected for recovering the values contained in the tailings, great quantities of which had accumulated from the stamp mills. A handsome profit is realized from this source. The claims worked by the Company are the Drumlummon, Nine Hour, Empire, Frankie, New Castleton and North Star. The Cruse North Star is being developed through the Drumlummon shaft under an arrangement entered into between Mr. Cruse and the Montana Company, and the Montana's drifts are being driven on the vein from the 400 and 600-foot levels which are yielding a good tonnage of pay ore. A number of claims adjoining this group have been bonded by this company. These will be actively developed during the coming year. It is to be hoped that the future development of both the old and new properties will be deservedly successful.

CRUSE MINE.

This property is owned by Thomas Cruse, located on Bald Mountain near Marysville. P. B. Dillon, Superintendent. Employs 75 men all told. Development consists of a tunnel 1,200 feet long from which is sunk a two-compartment shaft 200 feet deep, equipped with a good hoisting engine, 1-inch round cable and safety cage. Ventilation and timbering are good and an outlet is maintained for the further security of the miners. The product is gold and silver which is recovered in a 20-stamp gold and silver mill, having pans and settlers and is constantly operated on the ores supplies by this mine. The vein is a very strong one, exhibiting every evidence of stability and is quite uniform in size, producing a character of quartz which carries good values.

BELMONT.

The Belmont is owned by the Penobscot Mining Co. J. H. Longmaid, Manager. Frank Longmaid, Superintendent. Employs 90 men. The mine is developed by three tunnels and

shaft, No. 2 tunnel being 1,300 feet in length; No. 3 450 and No. 4 1,200. The shaft is sunk from the lower No. 4 tunnel and is 200 feet deep, making a total depth from the outcrop of 700 feet. Connection is maintained between the different tunnels thus furnishing pure air and a traveling way from the workings in either direction. Conditions as relates to the safety of the miners are favorable. A great deal of development has been accomplished in the course of the past two years and a steady output almost aggregating 100 tons per day maintained. To this an extensive territory must be opened and the veins be productive at many points. A large amount of development is being carried on in order to keep the ore supply ahead of extraction. The quartz carries gold principally, accompanied by some silver values. In treating the ores found in those veins a combination process consisting of stamp amalgamation and cyanide is applied. The bulk of the values are recovered on the plates, following which the tailings are conducted into tanks and subjected to the cyanide solution where the greater part of the remaining values are extracted.

EUREKA.

The Eureka is located at Rimini, owned by the Eureka Mining Co. J. H. Howard, Superintendent. Employs 25 men. The vein is developed by a shaft 400 feet deep, 100 feet of which was lowered in 1900. Upraises are driven from the different levels to the surface, supplying good air and means of exit. The hoisting is done by a 10x12 Lidgerwood engine, $\frac{3}{4}$ -inch cable and cage, the latter provided with all the safety devices required by law. The ledge is a large one enclosed in granite walls and varies in width from four to ten feet. Its product is galena, carrying gold, silver and lead. After being hoisted to the surface it is delivered to the railroad cars by an aerial tramway and thence to the Peck concentrator for treatment preparatory to smelting.

MONTE-CRISTO.

The Monte-Cristo is owned by the Kirby & O'Rourke, located six miles from Rimini, operated under bond by H. L. Frank. John C. Adams, Superintendent. Employs 12 men. This is

a copper-silver bearing ledge upon which a two-compartment shaft was sunk 150 feet deep and drifts extended on the vein for some distance. Several carloads of high grade copper ore was shipped during the progress of the work.

CRESCENT.

The Crescent is owned by the Crescent Mining Company, located some nine miles from Rimini. Jas. Shine, Superintendent. Employs 10 men. The vein is developed for 300 feet of its depth by an incline shaft, engine, $\frac{5}{8}$ -inch rope and bucket. The ore carries gold, silver and lead in fair quantities.

MONTANA COPPER CO.

A. E. Spriggs, Manager; John K. Waite, Superintendent. This Company is developing a promising group of copper-bearing claims on the north fork of the little Blackfoot river. Two tunnels are being driven and are now in the ledge 410 and 460 feet, respectively. The vein is a large, strong fissure and has prospected well for the distance opened in running the tunnels. Large bodies of fair grade concentrating ore have been developed. Should the condition continue in the further extension of the vein this group of claims will become highly productive.

BALD BUTTE.

The Bald Butte is owned by the Bald Butte Mining Co., located 3 miles from Marysville. B. H. Tatem, Manager. Wm. Shovel, Superintendent. 65 men find employment in the mine and works. The main tunnel develops the vein for a length of 2,500 feet and was run mostly in pay ore. Ventilation, timbering and all those things from whence danger arises to the miner, are safeguarded as much as possible. The new ground developed during the year proves the vein to be one of the most profitable gold-bearing ledges in the state. It not only yields a large output without taxing its capacity, but the ores also carries high average values. A very important strike was made on the property during the early part of the year in the discovery of a new vein in the footwall. This vein as far as

can be determined, is much narrower than the main ledge, but produces a superior quality of ore. The product is treated in a 40-ton stamp mill, owned by the company, as all the values are not recoverable by amalgamation. The tailings are run over concentrating tables and the base ore won and shipped to the smelter. A neat electric plant has been installed in the mill which, besides furnishing light to mine and mill, is very useful in operating the machine shop, blacksmith shop, etc.

JUSTICE MINE.

The Justice is located in the Rimini district, owned by Travis & Horsky. John Howard, Superintendent. Employs 30 men. Is developed by a shaft 150 feet deep, having a steam hoist of 15 horsepower, $\frac{5}{8}$ -inch rope and bucket. Separate connection is maintained between the workings and surface. The ore carries gold, silver and lead.

EMPIRE AND BELL BOY.

These mines are located within three miles of Marysville. These properties were recently purchased by Mr. Owen Byrnes. They have been worked intermittently for 12 years without gaining any considerable depth in that time. In the past they have been good producers. The Empire vein formerly kept a 40-stamp mill operating on its ores. Preparations are being made to secure greater depth. Regular shipments of ore have been made by parties leasing.

At Silver Camp Mr. Fred Dickert and others have been developing some claims which promise to develop into steady producers. Occasionally shipments are made, but only of the best quality of ore. The development of this district is greatly retarded by lack of cheap transportation the haul to smelting points by wagon being so expensive that no profit can be realized from the medium grade ores.

PORPHYRY DYKE.

The syndicate of which Mr. C. S. McLure is the head, have been driving a tunnel in this mountain of low grade, gold-bearing porphyry and have penetrated it nearly

1,000 feet. The work has been directed by Mr. Thomas Connor. This syndicate is constantly increasing its interests in property located on this dyke and ownership is now narrowing into hands that have the ability and can command the necessary capital to equip the property for operations on a vast scale.

CONSOLIDATED GRANITE BI-METALLIC.

This property is located at Granite, owned by the Consolidated Granite Bi-Metallic Company with Evener Ziegler, Manager; James Willoughby, Foreman. Employs 425 men underground and 185 on the surface and mill. The main shaft of the Granite is 1,600 feet deep and three compartments and that of the Bi-Metallic 1,700. They are connected by drifts in several levels. The stopes are timbered by square sets and stulls and crosscuts and drifts by tunnel sets. Ventilation is excellent. These properties are distinctly silver producers. Both shafts are equipped with powerful engines capable of developing the vein to a great depth, and double-deck safety cages provided with all the life-saving devices required by law. A 1-2x8-inch flat cable is used at the Granite and a 1-2x6-inch cable at the Bi-Metallic. This apparatus is regularly tested and kept in good working order. Fire plugs having a high water pressure furnish protection to the surface buildings and works. In providing safeguards for the protection of life and limb the management spares neither expense nor effort. During the year an electric power plant was completed at Flint Creek Falls, nine miles from Philipsburg. Two 550 K. W. Westinghouse generators three phase system, driven by direct connected Pelton water wheels of 900 horse power capacity each, operating under 700-foot head, have been installed. Steam power has been displaced at the Bi-Metallic mill, the machinery now being operated by electric power. The transmission line is extended to the mines with a view to further application of this power. A concentrator of 150 tons has been erected at the mines for the treatment of the low grade ores. These improvements in the reduction of cost effected now enables the Company to mine and treat profitably the immense bodies of low grade ore

which was left behind in the course of former development. This great fissure still yields its accustomed percentage of high grade ores. The new economies introduced, though entailing great expenditure, should result most profitably to the owners and be of untold benefit to the mines by way of indefinitely prolonging their life and increasing their productive power.

HOPE.

The Hope, located near Philipsburg, owned by the Hope Mining and Milling Company, Henry Repheldt, Superintendent, employs 25 men. The main developments consist of a tunnel 2,500 feet in length and a double compartment shaft 550 feet deep. A 50-horse power friction engine, 1-inch cable and safety cage make up the hoisting plant. There are three exits connecting the workings with the surface which provide escapements and good ventilation. The workings are securely timbered and particular attention is paid to the care and preparation of explosives. This famous old producer has yielded several millions in silver during the course of its many years of operation. Ore bodies of great size and richness have been developed and converted into bullion and again, sections have been exploited which have proved barren. The habits of the vein respecting the unequal distribution of its ores being thoroughly understood, development is carried forward in the faith bordering on certainty that another ore body will be discovered, and so it has invariably proven. The product is treated in the Company's mill which consists of ten stamps, pans and settlers.

SHAMROCK.

The Shamrock, located at Garnet, owned by McDermott & Lannon, P. S. McDermott, Manager, employs 20 men. A two-compartment shaft is sunk on the vein, equipped with a neat hoisting plant consisting of an 8x10-inch Lidgerwood engine, 3-4-inch cable and skip. There are two openings which produce good ventilation and provide means of exit. The product is a high grade galena carrying gold, silver and lead. This property has been a regular shipper for several years

and has produced handsomely for the amount of development done. Work is confined to a chute of ore which extends some 50 feet on each side of the shaft leaving the major portion of the claim unexplored.

RED CLOUD.

The Red Cloud is located at Garnet, owned by Mitchell & Mitchell. Peter Mussigbrod, Manager. Neil Carothers, Foreman. Fifty men are employed. The ledge is opened by three tunnels. No. 1 is 450 feet; No. 2, 500 and No. 3, 950. A shaft is sunk from the level of the No. 3 tunnel to a depth of 50 feet. The ore carries gold, copper, lead and silver, and is treated in a ten-stamp combination concentrating mill. A 6x8-inch engine, 5-8-inch cable and car handle the material from the section developed by the shaft. The stopes and openings are safely timbered and well ventilated the various tunnels being connected by upraises. The ledge on this property is a very persistent, regular fissure, being very uniform in size and productive throughout. Messrs. Mitchell & Mussigbrod own a group of 28 contiguous claims the following of which are operated under lease and producing considerable ore in the aggregate. The Lead King, Crescent, Fairview, Fourth of July, Guaymas and Caneville.

NANCY HANKS.

The Nancy Hanks is located at Garnet, owned by Larry Ritchie. The mine is opened to a depth of 280 feet by two shafts; a vertical of 100 feet and an incline sunk from the level 160 feet distance from the main shaft. Both shafts are provided with steam hoisting plants. An opening separate from the main shaft supplies air and an escape. In fact, the general condition of the mine meets all reasonable demands for safety. The values are gold, silver and a small per cent of copper, and of those metals the mine has been very productive for several years past. The property is now operated by Mr. L. C. Parker under bond. Active development is progressing and it is confidently expected that the results of the new work will justify the purchase of the property.

DIAMOND R. CONCENTRATOR.

The Diamond R. Company, of Neihart, during the past summer completed a concentrator of 150 tons capacity for the treatment of their low grade silver-lead ores. It has operated constantly since its completion on the low grade stuff piled on the dumps of the Moulton Mine. Ordinarily the addition of a mill of this kind only benefits a particular mine, or group owned by the company or individual for whose sole use it is intended and in the case of this plant I am not advised that it is the intention to treat any ores other than those coming from their own mines for which reason the mining property of the various other owners will not be immediately benefitted by its operation, excepting perhaps in the knowledge that later their low grade product will yield a profit. The successful treatment of the ores of this district by concentration is of vital importance, however, because it had become almost a settled conviction that concentration could not be successfully effected with the character of minerals produced in the district, this idea resulting from many and costly experiments in that direction. Now having devised a process and successfully demonstrating its ability to save a high per cent of the minerals and at a small cost, the future progress and development of the Neihart district depends altogether on the enterprise displayed in erecting additional mills.

FLORENCE.

The Florence is located at Neihart, owned by the Florence Mining Company. A. M. Henry, Manager. Daniel Leeny, Superintendent. This mine is maintained in the same excellent condition as noted in former reports. The first aim in the system of working would seem to be that of the safety health and convenience to the miner. To accomplish that end no effort or expense is spared, but in this fact it does not follow that the interest of the owners suffers in the least; on the contrary they are benefitted because at every minute of the working shift the miner can render the best service he is capable of. The Florence continues to be a steady, profitable producer; in fact, none more so among those producing lead-

silver ores.- The vein yields a rich quantity of ore and a good tonnage. Operations are carried on through two tunnels and a shaft sunk three hundred feet from the lowest of these. Forty men find steady employment.

GALT MINE.

The Galt is located at Neihart, owned by the Galt Mining Company. W. F. Oden, Superintendent. Employs 30 miners. The vein is developed for a length of 1,500 feet by a tunnel and 100 feet lower than this tunnel by a shaft. Ventilation is very good, an outlet for escapement being kept between the workings and the surface. Excepting the main passageways little timber is used or required as sufficient waste matter is mined with the ore to fill the stopes. The product is lead-silver. This property has produced a large quantity of high grade ore during the years of its operation and late developments warrants the belief that the future output will at least be equal and probably exceed that of the past.

GOLD CREEK MINE.

This mine is located six miles from Neihart, operated by Messrs. Harrison & Condon. A shaft 100 feet in depth was sunk on this property and the vein drifted on for several hundred feet. Six men are employed.

BROADWATER MINE.

This mine is located at Neihart. This famous old producer has been in the hands of leasers during the past three years. It is the most extensively developed property in the Neihart district, being opened by three tunnels of 2,000 feet each. About 40 men have been working on the mine, mainly re-working the old stopes and following small streaks of ore left behind by the owners. In this way a great deal of ore has been extracted. The values are silver and lead. Since my examination of the property I have learned that the property has been purchased by Mr. McLure for the Diamond R. Company, who intend building a tramway from the mine to their mill and concentrating the dumps.

SILVER BELT.

The Silver Belt is located at Neihart, owned by Silver Belt Mining Company. D. L. S. Barker, Manager. This property was recently acquired by Mr. Barker and his associates who have sunk a shaft 65 feet and drifted 150 feet on the vein, from which drift an upraise has been made to the surface. They have also started a crosscut tunnel further down the mountain which is in 100 feet and when completed will give a depth of 200 feet on the vein. This is an exceedingly promising looking property. Indications point to it developing into a good producer.

BIG SNOWY.

The Big Snowy is located at Neihart, owned by the Big Snowy Mining Company. D. L. S. Barker, Manager. This property is opened by a tunnel 800 feet in length which is timbered with tunnel sets. A separate outlet provides ventilation and a means of exit. The ore yields gold and silver.

BENTON GROUP.

The Benton group is located seven miles from Neihart and is owned by J. C. C. Barker. The mines are worked under a system of leasing by which the mines are divided into sections and the right of working and extracting the ores found in the respective sections granted to different parties of miners, the consideration being a certain agreed per centage of the value of the ores produced. In this way the ledge has been exploited for several years, making a large contribution to the annual output of the district. Two tunnels which are connected by an upraise develop the vein, employs from 10 to 30 miners.

BIG SEVEN.

This mine is owned and operated by the Big Seven Mining Company, located seven miles from Neihart. D. L. S. Barker, Manager. It is developed by tunnel openings and a shaft sunk from the main working tunnel. The product is a high grade gold and silver bearing ore of which the vein produces a good

tonnage. An upraise is made from the lowest tunnel on the hillside to the surface and at a point designed to give good air to the working sections of the mine, besides providing a convenient means of exit. In other respects the requirements of safety are reasonably observed. From 25 to 50 men are employed. This property recently shut down pending a decision as to future and deeper developments.

The silver-lead producing district of Barker has not been very active. Several properties which yielded a steady output in 1899 have ceased operating for the present, or, as in some instances are being worked by leasers on a small scale.

FERGUS COUNTY

GILT EDGE MINE.

This mine is situated at Gilt Edge, owned by the Great Mining and Development Company, E. W. King, Manager. This deposit is tapped by several short tunnels and all material is handled through a main working tunnel 1,600 feet in length. The management exercises a conscientious supervision over those details which tend to promote the health and prevent accidents to its employes. Several claims are embraced in the group owned by the company, the Gilt Edge and Lookout being the principal ones developed. These produce a daily output of 140 tons of gold-bearing ore. The gold is recovered by the cyanide process. A mill of 140 tons capacity has been in constant operation since it was erected in 1899, recent developments have exposed extensive bodies of fine milling ore at present there being at least two years' ore in sight. Eighty-five men all told are employed.

SPOTTED HORSE.

The Spotted Horse is located at Maiden, operated by the Johanna Gold Mining Company. A. H. S. Bird, Manager. This famous old property is developed to a depth of 450 feet by a double compartment shaft, equipped with a 20-horse power friction engine, safety cage and one-inch cable. Ven-

tilation, timbering and means of egress meets every reasonable requirement. Ten men are employed. There is a combination stamp and concentration mill connected with the mine. Were the Spotted Horse located in one of the centrally situated mining districts there is little doubt that it would have been thoroughly exploited before this. As it is, fully half the ground opened by the shaft has hardly been touched in a horizontal direction. The ore is very irregular in occurrence, developing large bodies of extremely rich ore of telluride character and again pinching to a mere crack in the limestone. The tendency of ore to make in deposits more or less extensively in limestone formation demands a more extensive plan or exploration than is required in proving the veins found in other formations. Experience has shown that no considerable piece of ground can with any degree of certainty be left unprospected as a bonanza may be contained in any section. Had a reasonable percentage of the earnings of this property in its productive times been expended on intelligent development, it is very probable that it would still be a generous contributor to the wealth of the state.

NEW YEAR AND OLD BATCH GROUP.

This group is located at New Year, 15 miles from Lewistown, owned by the New Year Gold Mining Company. Joseph Merideth, Superintendent. Albert Winston, Foreman. These properties are prospected by a number of short tunnels, the principal development being carried on through a tunnel 500 feet long. Connections have been made through the different workings providing an ample supply of air and means of egress. Square sets and stulls are used in timbering, the respective methods being employed as required by the width of the vein. The ore yields gold. A strong Company organized by outside capitalists was perfected to exploit this group during the year, and development has been vigorously prosecuted since the new company assumed control. The new sections have developed immense bodies of profitable milling ore which yield values in the cyanide solution. Prior to taking the property the several claims embraced in the group were prospected and many trial tests made upon the ores, resulting

so satisfactorily that the mill has since been enlarged to 150 tons capacity. Seventy-five men are employed in and around the works.

SAPPHIRE MINE.

This mine is located at Yogo, owned by the New Sapphire Mining Syndicate. J. C. Sikes, Manager. Employs 35 men. The Company has enjoyed a most prosperous season this year, the yield of gems far exceeding that of previous years. The gems are found in a large vertical fissure from six to 15 feet wide which has been mined in open cut, sluicing to a depth of 75 feet. After reaching the outside the material is piled up until it disintegrates which requires several months, when it is run through sluice boxes fitted with riffles and the gems recovered in the same manner as placer gold. The quality of the sapphires produced at Yogo is superior to any found in the state, being dark blue in color and possessing a standard market value. A tunnel 400 feet in length was driven during the year and a 100-foot double compartment shaft sunk. In future the material will be mined and handled in the same manner as the metallic veins.

BEAR GULCH MINING COMPANY.

This Company is located at Jardine. A. J. Jardine, Manager. Thomas Robeling, Superintendent. Employs 100 men. The mines worked by this company are the Keats, Lowash and Legal Tender. The Lowash and Legal Tender are located on the same vein. Development is carried on through six cross-cut tunnels from 200 to 600 feet in length. The veins are drifted on at the different depths attained by the tunnels for hundreds of feet and immense ore bodies blocked out. A mill of twenty stamps and nine concentrating tables treating 85 tons per day, has operated continuously on the ores supplied from these veins. Gold is the valuable metal contained in the quartz. As now developed, this group is capable of turning out a large daily tonnage of profitable milling ore and at a reasonable cost for mining. The mines are well timbered and ventilated, connections being kept open between the various workings.

REVENUE.

The Revenue, located at Jardine, is owned by the Revenue Mining Company. Owing to contention between the owners, this property was placed in possession of Mr. T. M. Swindlehurst as receiver, who carried on some little development pending the settlement of the differences. The mine is opened by three tunnels ranging from 300 to 600 feet in length. This property is located on the same veins as that of the Bear Gulch Mining Company's property and will become an active producer when the matters at issue are adjusted. A complete modern stamp mill was erected two years ago which, up to this time, has not been put in commission.

ELKHORN QUEEN.

This mine is located near Elkhorn, operated by Messrs. Hill & Robinson. W. H. Robinson, Superintendent. Employs 25 men. Work is carried on through a three-compartment shaft 300 feet deep with a hoisting plant consisting of 10x12-inch engine, 3-4-inch cable and safety cage. Timbering is done with square sets and stulls. Good ventilation and means of egress is supplied by an upraise carried through the workings to the surface. The mine produces a good tonnage of lead carbonate and galena ores which yield fair gold and silver values. The property is not developed beyond the section which is being attacked, some 50 feet long by 30 wide.

BELL.

The Bell mine is located eight miles south of Clancy, owned by C. W. Flemming who manages the property. Employs 20 men. Two tunnels are driven on the vein which prospect it for a length of 500 and 900 feet respectively. Several chutes of pay ore were developed in the course of this work, and the continued extension on the vein shows favorably for a future steady output. The general condition of the mine as respects the safety of the miners is good, gold, silver and lead in small quantity are the values contained in the ores.

GOLDEN SUNLIGHT.

This mine is located five miles from Whitehall, owned by the Golden Sunlight Mining Company. The property is in the hands and is operated by a receiver. Mr. F. W. Bacorn, Receiver. Employs 10 men. The ledge is developed for a length of 1,600 feet by two tunnels 400 feet apart on the depth of the vein. Its product is an iron sulphide carrying gold and some silver, small shipments of which are regularly made. An upraise connecting the tunnels is kept in good condition for travelling. The walls and vein are hard and solid relieving the miner from fear of accident from that source.

EVA MAY.

The Eva May is located on Cataract Creek, seven miles from Basin, owned by the Montana Mineral Land Development Company. A. J. Poser, Superintendent. This property is developed to a depth of 600 feet by a two-compartment shaft, 150 feet of which was sunk since 1898. The vein shows improvement with depth, extensive ore bodies being encountered in the lower levels. A 50-ton concentrator is supplied to its capacity. The management having neglected to keep the upraises connecting the workings with the surface in repair, it had become unsafe for traveling. Notice was served to make the necessary repairs without delay and make an upraise between the 500 and 600 foot levels.

IRON MINE.

The American Smelting and Refining Company are working an iron ore mine four miles from Elkhorn. It is opened by two short tunnels and shipping from 75 to 100 tons per day to the smelter. Twenty-five men are employed.

GREY EAGLE.

This mine is situated in High Ore Gulch. Was operated during the early part of the year and up to the time of its suspension was producing satisfactorily. Work may be resumed at any time.

COMET.

The old Comet continues to yield a small tonnage to leasers. Work is confined to the upper part of the mine where occasional bunches of good carbonate ore is uncovered.

MINAH.

At the Minah, near Wickes, from 10 to 20 men are working various sections of the vein under lease. Most of them fare better than the regular day's wage.

KATY.

The Boston and Bay State Mining Company, owners of the Katy mine at Basin, after expending an immense amount of money in the erection of a smelting and concentrating works of large capacity, and in the development of the mine and other improvements, stopped all construction and closed down the mine. The property is at present in charge of a receiver and nothing could be learned regarding the future plans of the company.

ELKHORN.

This old producer has lain idle during part of 1899 and all of the present year, the Company having abandoned hope of further working it at a profit. A deal was recently made by which the property was transferred to the well-known mining firm of Longmaids, and plans are now under consideration looking to the resumption of operations in the near future. The success which has attended the past efforts of this firm in profitably handling mines considered worked out, inspires confidence in their ability to re-establish the Elkhorn on a paying basis.

THE OVERLAND AND BONANZA CHIEF MINES.

The Overland and Bonanza Chief (separate properties) have worked intermittently during the year. Considerable development was done on the latter prior to its closing down.

AT LUMP GULCH AND CLANCY CREEK.

In these districts a number of claims are being developed on a small scale either by the owners or by lease and bond conditions. The amount of ore produced by lessees and small concerns goes a long way towards making up the aggregate output of the country.

BROADWATER COUNTY

EAST PACIFIC.

The East Pacific mine is located seven miles from Winston, owned and managed by R. A. Bell, produces gold, silver and lead. The vein is developed by four tunnels ranging from 1,500 to 3,000 feet. That part of the mine from No. 3 tunnel to the surface is leased in blocks and considerable ore is extracted therefrom. Some two and a half years ago work was commenced on a long tunnel, No. 4, with a view to developing the vein to the greatest depth obtainable by tunnel. This was an undertaking of considerable magnitude as 2,400 feet had to be driven in the hard diorite before encountering the eastern end of the ore. A length of 3,000 feet has now been secured. 600 feet of which is in the ledge and a depth of 200 feet of stoping ground developed. An upraise which supplies plenty of pure air and a travel-way has been made. The tunnels are timbered with sets and the stopes prevented from caving by filling with waste material.

STRAY HORSE.

The Stray Horse mine is located eight miles from Winston, owned by the Ajax Mining Company. This property is now being worked by lessees and is producing a small quantity of ore carrying fair values in gold, silver and lead. The last development done by the company was the driving of a 1,200 foot tunnel at the lowest feasible point on the hill. In this a very large quantity of concentrating ore was encountered. There are also considerable bodies of a like quality of ore in

the upper parts of the mine, all of which can be successfully and profitably utilized whenever the company decides to erect a concentrator.

DIAMOND HILL.

The Diamond Hill mine is located at Hassell, owned by the Diamond Hill Gold Mining Company Limited. Andrew Urquhart, Manager. Considerable development work was done since the resumption of operations in the early part of the year and 30 to 40 stamps of the plant employed in treating the product. This property consists of an immense deposit of low grade gold bearing milling ore. Owing to a scarcity of water for power and milling purposes work has been greatly curtailed and the output decreased in consequence. The workings are timbered with square sets and several openings are made to the surface. Recently the works were obliged to close down for the winter.

HARD CASH.

This mine is located about five miles from Radersburg, owned by Mayne & Easterly and operated by J. E. Jackson. Employs 15 men; is developed by two tunnels of 456 feet and 500 feet respectively, and a shaft 130 feet deep. The ore is an iron sulphide carrying gold. There are three exits which give a plentiful supply of air. Stulls are used in timbering the workings.

KEATING AND OHIO.

These mines are located at Radersburg, operated by J. A. Keating and Blacker by Tregonning & Co. These properties are developed to a depth of 300 feet by shafts and are profitable producers, yielding annually a large amount of gold. The product of the Keating properties is treated to concentration in a five-stamp mill owned by Mr. Keating. The district in which these claims are located offers special inducement to the investment of capital that is seeking promising gold leads.

The district is highly mineralized and accessible, and effort capably directed can hardly fail of success. The management of these properties are mindful of the claim of their employes to proper protection from accident and reasonable provision for the preservation of their health.

THE CUSTER, IRON AGE, STOLEN SWEETS.

These are separate properties. The Custer is owned by C. N. Clark & Co., and worked under a leasing system. The Iron Age is owned by Dodge & Hill, operated through an incline shaft 500 feet deep provided with a whim hoist. Gillis & Fahlgren have charge of the Stolen Sweets and have developed it by an incline shaft to a depth of 560 feet. The product of these veins is chiefly gold and dip into the hill at a moderate angle. During the past two years they have produced a large quantity of high grade ore which is shipped to the smelters for reduction. Deeper development assures a continuance of and a probable increase in production. The regulations affecting the lives and general welfare of the miners while underground are reasonably well complied with. Between 50 and 60 men are employed either for the operators of these properties or leasing for themselves on a percentage basis.

FLATHEAD COUNTY

WEST FISHER CREEK MINING COMPANY.

This property is located on West Fisher Creek, 40 miles west from Libby. Edward Murphy, Manager. In 1899 the Company began active development on its group of gold-bearing claims and completed it late that year. A 15-stamp mill and tramway for transporting the mine product to the mill. Since the completion of the plant, the further development of the lode and extraction of the required tonnage has gone steadily forward and the mill kept continuously grinding to its capacity. Thirty men are employed for whose safety and wants while underground a due regard is shown by the management.

KOOTENAI.

The Kootenai is owned by the Kootenai Mining Company, located on Blacktail Creek, 38 miles from Libby. Joseph Beager Superintendent. This is a free milling gold property and is developed by tunnel openings. The work done on the mine during the past two years resulted in uncovering ore bodies of such

extent and values as to justify the erection of a 20-stamp mill for the reduction of the product which is now about completed. The district in which this and the West Fisher Creek Mining Company's properties are located promises, with development to become a very productive gold bearing section. Many prospects are being exploited with such excellent results that some of them can hardly fail to develop into paying producers.

THE SNOWSHOE MINE AND WORKS.

This property is located 18 miles from Libby. It was shut down the latter part of July, not because of a falling off in production or of the vein becoming impoverished, but pending the settlement of questions pertaining to the removal and enlargement of the concentrating works and site of operations to a location on the opposite side of the mountain which offers greater natural advantages than the one now occupied.

LIBBY CREEK MINING COMPANY.

The mines of the Libby Creek Mining Company, situated nine miles south of Libby, which started off in 1899 by doing a large amount of development work in the mines and erecting a 150-ton concentrator, closed down during the winter of 1900.

DEER LODGE COUNTY

EMERY.

The Emery mine is owned by Bielenberg & Co., and is operated under lease by W. I. Higgins who is General Manager. R. W. Eames, Superintendent. Employs 35 men underground, 8 topmen and two engineers. The main shaft is down about 700 feet on an incline of about 35 degrees, about 150 feet having been sunk during 1900. The ore carries gold, silver and lead. The mine is timbered with stulls. There is a skip in use, a 1-inch cable and Davis engine, 8x10-inch cylinder. There are two outlets and ventilation is good. There is an air shaft 250 feet south of main shaft that connects each level. A Rand air compressor of five-drill capacity is in use.

CLEMANTHA.

This mine is located at Coloma, owned by the Clemantha Mining Company, operated by Sanders & Talant. Employs eight men. A single compartment incline shaft is down 360 feet. Hoisting is done with 20-horse power Ottumwa engine, 3-4-inch cable and cars. Timbering is done with tunnel sets and stulls. The mine has been a fair producer for several years, and if developed sufficiently would in all probability largely increase the output. The values are gold and silver.

MONARCH.

Postoffice address, Basin, Montana. This property was operated part of the year by the Monarch Leasing Company. The shaft was sunk 100 feet, making a total depth of 200 feet. A long crosscut was driven in the formation and the vein drifted on for some distance. The vein failing to yield satisfactory values at the point prospected, the mine was closed down.

COPPER CLIFF.

This property is located about 15 miles from Bonita, owned by Sam Adams & Co. Considerable development work was done on this property during the year by Linnemann & Schmidt and H. L. Frank of Butte. Tunnels, drift and crosscuts, aggregating several thousand feet were driven, and also a shaft sunk 100 feet. Some good looking copper ore was found. The vein is a very large one and indications are favorable for it developing into a paying producer.

MEACHER COUNTY

NORTH PACIFIC, ST. JOHN AND COPPER MINES.

These mines are located at Copperopolis, operated and managed by W. W. McDowell, John Blewett, Superintendent. Employ 75 men. Operations are carried on through three shafts, their respective depths being: North Pacific, 500 feet, equip-

ped with 10x12 engine, 7-8-inch cable and safety cage. St. John, Copper Claim, 200 feet deep, steam hoist. The district in which those properties are located has long been known for its copper veins, occasional shipments of high grade copper ore being made from there for years past, but until within two years no systematic effort was made to develop or prove their worth. The work which is being prosecuted under Mr. McDowell gives every promise of developing a rich group of copper mines; in fact, a large quantity of ore is regularly shipped. The veins, contrary to the prevalent idea, are large and produce several varieties of copper ore. Every reasonable precaution is taken to prevent accident to the employes.

THE SILVER-LEAD CAMP OF CASTLE.

Has fallen behind previous years. Several mines which were productive in 1899 and some years preceding have either closed down entirely or are worked by lessees in a small way. This work is mostly limited to the parts of the veins accessible by drift openings.

TETON COUNTY

CEDDED STRIP OF THE BLACKFEET INDIAN RESERVATION.

The territory covered by this title is a new mineral district that was added to the others of the state a couple of years ago through its purchase from the Indians by the Government and opened to location under the mineral act. At the time of the opening there was a rush of prospectors and about 100 quartz claims were located, the great majority of which were made on two parallel fissure veins that cut the precipitous mountains in a northwest and southeasterly direction from Divide Mountain to Grinnell Mountain, a distance as the crow flies of over ten miles. These veins were distinctly marked, as they cut cleanly through every formation and leave the vein matter visible above the shale covering the lower portions of the mountains.

The mountains of this district are very precipitous, ranging from 8,000 feet altitude above sea level to 2,500 feet.

Since the locations of the claims mentioned, the majority of them have been placed in two groups, one with Messrs. Holmes & Calderhead, and the other with a company organized in this city by the late Mr. Esler, the two covering about all the locations made on these fissures. Messrs. Holmes & Calderhead are running five tunnels, located at different points best situated to develop and demonstrate the mineral value of about fifty claims that are under their control, and at this writing these tunnels are in approximately about 250 feet, but in no instance have as yet secured permanent mountain (thermal) water. The indications are, however, that exceptionally valuable mines will be developed when sufficient depth is secured. On Canyon Creek, where the Esler Company are operating, one tunnel has secured a length of over 400 feet and is now in a high grade of clean concentrating ore, and as the surface indications, formation and vein filling is identical in all the mountains cut by these leads, there is little question that the same results will be secured with similar depths. The vein matter is an unstratified diorite and is all more or less mineralized, and on the surface, in places, shows very rich mineralization with bornite and pyrite of copper and carrying values of gold and silver. In the development secured through the district some fine ore has been revealed and some quartz streaks encountered that cut irregularly through the vein matter, and are composed of quartz, spar and practically pure metal. All of the vein matter carries iron varying from 5 to 30 per cent. The leads on which the development is in progress will vary from 15 to 40 feet in width. If the anticipated rich deposits of copper ore are revealed, as seems entirely probable, the product is likely to be reduced in the immediate vicinity, as nature has provided every economical facility. If the district turns out as anticipated and warranted by all surface indications and the revelations of the slight development so far secured, it will materially add to the output of the mineral wealth of the State.

HIDDEN TREASURE AND WEST POINT.

These mines are located near Clinton, owned by Judge Stevens of Missoula. They are being developed by two tunnels. No. 2 tunnel, located nearest the base of the hill, has been extended to a point that gives a depth of 500 feet on the vein. This district is showing encouraging indications of developing copper in great quantity, a fair quantity of that ore having during the past two years been shipped from these two claims. Fair values in gold and lead are also contained in the ore. Should the veins prospect as well in depth as they have to the present time, the vicinity of their location will in the near future be the center of large mining operations.

COPPER BELL.

This mine, situated near Clinton, is operated by a Company of Milwaukee capitalists. F. B. Williams, Manager. It is a copper-gold property, bonded during the year to the present operators who are developing the ledge by a two-compartment shaft now 200 feet deep, sunk from a tunnel. A 25-horse-power steam hoist and rope are used in hoisting the material to the surface.

Mr. J. P. Porter has secured options on two promising groups in the same vicinity, the Alladin and Cape Nome. Plans are completed for the equipment of these properties to develop them to a depth of 500 feet. Prospecting is quite active in the mineral region tapped by the Couer d' Alene branch of the Northern Pacific railroad which should result in uncovering some valuable lodes.

CARBON COUNTY COAL MINES

ROCKY FORK COAL COMPANY.

The mines of this company are located at Red Lodge, the county seat of Carbon County and is the terminus of the Rocky Fork branch of the Northern Pacific railway. D. G. O'Shea,

Resident Manager. Robert Pettigrew, Superintendant. The mines produce a good quality of lignite coal which is used largely for steam purposes on the Montana divisions of the Northern Pacific Railway. It is also an excellent domestic fuel, the supply placed on the local markets for this purpose not equalling the demand during the year. The coal seams in this field are numerous and not far apart, the strata between the same being some 300 to 400 feet thick. Work at presnt is mostly confined to Nos. 2 and 4 seams on which slopes are sunk to a depth of 1,800 and 2,500 feet respectively and are worked on the double entry system. The workings are generally well ventilated and every recommendation offered for its improvement in places where it might be temporarily poor have been cheerfully complied with. Timbers are furnished without stint for the protection of the miners and a general disposition shown by the management to safeguard the lives and persons of their employes while underground. Five hundred men are employed in the several departments during the greater part of the year, this number being slightly reduced in the summer months. In 1899 the expanding business of the Company made necessary vast and expensive improvements as aids to increasing production and facilities for handling it. A modern coal plant has been in the course of construction for nearly two years and was lately put in commission. The new and old plant consists of boiler plant, 860 horse-power; two pair of haulage engines of 350 and 200-horse power; one McEwen engine for driving electric generators 350-horse-power; one Eddy generator 265-horse-power; seven electric mining and shearing machines; one electric locomotive. Electric power is also used for pumping the mine water, in shops and for general purposes several other steam engines are employed, such as operating box car loaders, screening and elevating machinery and running ventilating fans, the whole making a works of considerable magnitude.

CARBON COAL COMPANY.

The mines of this company are located at Carbonado. Henry Burrell, Manager. E. S. Cunningham, Superintendent. Located on the Rocky Fork branch of the Northern Pacific Rail-

way. This seam is worked through a shaft 900 feet deep and produces 450 tons of lignite coal per day, nearly all of which is used for steam and smelting purposes at the Anaconda Smelting Works. A 21-foot fan is used for ventilating the mine, supplying a current which keeps the workings well aired. Some time ago the plan of working was changed from the double entry to the longwall system. The change benefitted both the company and the miners. It was found that conditions favored the later system, materially increasing the tonnage per man and producing it cheaper. One hundred and seventy-five men are employed in the mine and works. In equipping this property no expense was spared. The buildings are constructed of brick and steel. The head frame is a steel structure 90 feet high from the collar of the shaft. The tippie building is erected at and covers the shaft having a dimension of 40x150 feet, constructed entirely of steel. Hoisting is done with a pair of Litchfield engines 24x48-inch cylinders, 1-inch cable, cage and car of one and one-half tons capacity. The plant is designed to handle a very large output.

CLARK'S FORK COAL COMPANY.

The mines of this Company are situated at Gebo, on the Clark's Fork branch of the Northern Pacific railway. Henry Burrell, Manager. Henry Welch, Superintendent. Employs 180 men. It is a four per cent slope opening penetrating the seam which is six feet thick for 1,500 feet. It is worked on the double entry system and ventilated by fans. The coal is mined by electric machines and used for steam and domestic purposes. The coal is hauled to the surface by means of a 150-horse power Ottumwa engine and 1-inch rope. From the mine entrance to the tippie it is hauled on an electric railway a distance of 4,800 feet. In 1899 a very complete steam and electric plant was completed consisting of new haulage engines, two electric generators of 135-horse power each, electric mining machines, railway and steel tippie capable of making five different grades of coal.

BRIDGER COAL COMPANY.

The mines of this Company are located at Bridger which is

the terminus of the Clark's Fork branch of the Northern Pacific Railway. T. P. McDonald, Manager. Wm. Baldwin, Superintendent. The seam is 4 1-2 feet thick and produces a good quality of lignite coal which is used at the Butte smelters and sold in local centers for domestic uses. One hundred men are employed in the mine and 30 in other departments. An incline slope of slight pitch penetrates the seam for 2,700 feet. It is worked on the double entry system and ventilated by fan. The haulage plant is located 800 feet away from the slope to which point the product is hauled from the interior of the mine and run from there to the tipple by an electric locomotive a distance of one mile. The haulage plant consists of two motors of 125-horse power each, power being supplied by two dynamos of 200-horse power each, the latter operated by two McEwen high speed engines, size 19x20-inch cylinders, running at 200 revolutions per minute and rated at 250-horse power each.

CASCADE COUNTY COAL MINES

COTTONWOOD COAL COMPANY.

These mines are located at Stockett on the Stockett branch of the Montana Central Railway. Lewis Stockett, Manager. James Pearson Superintendent. Employs 280 men underground and 143 on the surface. This field is developed by three drift openings operated independently of each other, excepting that the haulage from all is done by one haulage plant, located at a central point for the three mines. No. 1 mine is opened 2,600 feet; No. 2, 3, 500 feet and No. 4, 1,300 feet. The engine is of the Litchfield type 24x36-inch cylinders and rope used is 1 1-4-inch steel wire. The seam is from five to six feet thick and is worked on the double entry system. Ventilating is by fans, one of 15 feet diameter being placed in each mine. The coal is lignite and a great part of the output is used by the Great Northern and Montana Central Railways. Every reasonable effort is made by the management to keep the mines in a safe and healthy condition.

SAND COULEE COAL COMPANY.

These mines are situated at Sand Coulee, the terminus of the Sand Coulee branch of the Montana Central Railway. Lewis Stockett, Manager. James Pearson, Superintendent. Furnishes employment to 130 men underground and 21 in other departments. The coal is lignite chiefly used for steam purposes by the Great Northern and Montana Central Railways. No development has been done in these mines for two years, the work done in the meantime being to drawing the coal from the pillars of the entries and roadways which were opened in previous development.

ANACONDA COPPER MINING COMPANY'S COAL MINES

These mines are located at Belt on the Neihart branch of the Montana Central Railway. F. W. C. Whyte, Manager, J. J. Kinney, Superintendent. Employs 394 men underground and 112 on top. The seam is developed for a length of 8,000 feet by a drift opening. It is worked on the double entry system and is ventilated by a fan of 20 feet diameter. The vein is between six and seven feet thick, the top strata being a fair steam and smelting coal, and the bottom seam of two feet thick a coking coal. When working to their capacity this Company is capable of producing 3,000 tons of the different grades of coal per day. The output for the year has been considerably less than that and mainly owing to the mines and smelters of the Company taking part of their supply from other sources. The plant consists of a powerful Litchfield engine, 1-inch cable and cars of 2 1-2 tons capacity, 45 of which are hauled from the interior to the tipples each trip. A washer of 500 tons per day capacity is operated in removing the impurities from the coking coal before going to the ovens of which there are 100.

GALLATIN COUNTY

CHESTNUT MINE.

This mine is located at Chestnut on the main line of the Northern Pacific Railway owned by the Union Pacific and North-

ern Pacific Railway Companies. Johnson & McCarthy, lessees. J. C. McCarthy, Manager. Employs 75 men. The seam is vertical varying from 12 to 20 feet in width. All of this is not merchantable coal, there being several bands of slate and foreign matter between the different coal seams. The vein is opened by a drift entry for a length of 10,000 feet and is worked by room and pillar system. The excavations made in mining out the vein are refilled by its own product and the surplus above what is required for that purpose drawn off through chutes in clean coal. The mines produce a desirable quality of steam coal of bituminous character. Ventilation is supplied by fan and in sufficient quantity to keep the workings clear of injurious damps and dangerous gas. In 1899 the surface works were enlarged by the addition of a coal washing plant of 500 tons per day capacity. It was constructed for the purpose of recovering the considerable percentage of coal in the mine filling. This mass of coal and waste material, of which there are several hundred thousand tons, can be safely drawn from the worked-out sections of the vein and delivered to the washer at a trifling cost, yielding a fair profit in the operation.

MOUNTAIN SIDE MINE.

This mine is situated on the main line of the Northern Pacific Railway at Chestnut, owned by the Mountain Side Coal Company. M. J. Johnson, Manager. Employs 70 men. This vein is opened by an entry 1,800 feet long. The coal is a fair quality of bituminous and is used in the local trade centers for steam purposes. Room and pillar is the system adopted for working the seam. Ventilation is provided by a 12-foot fan and is reasonably good.

PARK COUNTY

MONTANA COAL AND COKE COMPANY.

The mines of the Montana Coal and Coke Company are at Aldridge, 2 1-2 miles from the Park branch of the Northern

Pacific Railway. Ware B. Gay, Manager. Wm. G. Muse, Superintendent. Employs 100 men underground and 75 in other departments. The mines produce a bituminous coal of good quality. All of it is converted into coke and used at the smelters. The seam is opened by a drift entry 5,500 feet long and by a slope 600 feet deep. Equipped with a 40-horse power engine and 1-inch cable. When visited it was found that the air supplied by furnace was insufficient to properly ventilate the workings and that in some parts of the mine the men were suffering in consequence. Examinations also showed that the furnace was not capable of supplying any greater volume of air than it was then doing. Notice was served to erect a fan of sufficient capacity to supply a current that would properly ventilate the mines and to stop work in certain of the worst places until this was done. These recommendations were complied with and the fan was completed the latter part of October. The Company operates 150 coke ovens at Horr, 2 1-2 miles from the mine, 50 of which were built this year. The coal is run through a washer at the mine from which it is transported to the bunkers at the coke ovens through a water flume. A large electric plant was erected during the year and a car tramway built connecting the mines and coking plant. I am advised that this will not be put in operation this year.

ELECTRIC MINES.

This property is located near Horr on the Park branch of the Northern Pacific Railway, owned by the Montana Coal and Coke Company. Ware B. Gay, Manager. Employs 30 men. This property was formerly owned by the Butte and Yellowstone Coal and Coke Company and transferred to the Montana Company this year. Two seams of coking coal are developed to a depth of 750 and 500 feet respectively. A steam hoist and 5-8-inch cable are used in hauling the product to the surface. Ventilation is fair, natural means being as yet employed. Fifteen ovens are operated in converting the mine product into coke.

MOUNTAIN HOUSE COAL COMPANY.

This mine is located at Trail Creek on the Gallatin Valley branch of the Northern Pacific Railway. C. W. Hoffman, Manager. James Anderson, Superintendent. The seam is 4 1-2 to 5 feet thick, opened by a slope to a depth of 200 feet. The coal is hauled to the surface by means of an 8x10-inch Lidgerwood engine and 7-8-inch cable. Thirty men are employed. Ventilation is good. The coal is semi-bituminous and desirable steam and general domestic fuel. Some difficulty is experienced in producing a clean article, the coal being harder in places than the enclosing rock, and the vein having a steep pitch, it inevitably happens when blasting coal that more or less slate will be mixed with it no matter what may be done to prevent it under present circumstances. Should further development bring about a change in the conditions enclosing the seam that would admit mining the coal cleaner, or the Company put in a washer, or other device for that purpose, the product would be rank high among the fuels of the state.

TRAIL CREEK COAL COMPANY.

This property is situated at Chimney Rock on the Gallatin Valley branch of the Northern Pacific Railway. A. B. Cook, Manager. George White, Superintendent. Employs 30 men. This seam is opened by a tunnel 185 feet long, from which is sunk a double track slope 260 feet deep. It is worked on the room and pillar system and ventilated by natural pressure. The coal is of semi-bituminous quality and from 10 to 15 feet thick. It is a superior steam fuel and gives good satisfaction as an article for general use as fuel, it having a high percentage of fixed carbon and volatile matter. The field in which this property and that of the Mountain House Company is located shows rare good promise for the development of large coal measures.

Report of Deputy State Inspector of Mines

Butte, Montana, December 1, 1900.

Mr. John Byrne, State Inspector of Mines, Helena, Montana.

Dear Sir: I herewith submit for your approval my annual report of the mines examined, list of accidents, etc., during the year ended November 30, 1900. I remain your obedient servant,

FRANK HUNTER,
Deputy State Inspector of Mines.

The year 1900 was an active period in the mines of Butte. The mineral production of the district was probably the largest in its history, a greater number of men having been employed at all of the copper properties during the summer and fall than at any time during the preceding year.

The chief event in the history of mining operations in this district during the year was the total destruction by fire of the hoisting plant of the Parrot, entailing a loss of about \$100,000. Luckily, however, no lives were lost. The work of reconstruction was begun at once and within a few weeks a temporary shaft house had been erected and the work of extracting ore was resumed. Several of the leading mining companies have learned the lesson taught by this fire and have taken additional precautions against dangers of this kind

THE ANACONDA COPPER COMPANY

The mines operated by the Anaconda Copper Company during the year 1900 were the Anaconda, St. Lawrence, Never Sweat, High Ore, Bell, Diamond, Green Mountain, Mountain Consolidated Nos. 1 and 2, and the Buffalo. The ore is copper and silver as a by-product. This company has safety doors on all its cages, and the safety appliances are tested each week. Wm. Scallon is General Manager. The Company employs 3932 men in and about the mines.

ANACONDA.

John O'Neill, Superintendent; D. Kennedy, Foreman. Employs 730 men underground, 120 topmen and 3 engineers. The main shaft is down 1,800 feet, of which 100 feet was sunk in 1900, and has three compartments. Electric flash lights are used for call bells. The mine is timbered with 10x10 square sets. There are two double-deck cages with two 8-ton skips attached. A Union Iron Works engine 30x72 with a flat steel rope 1-2x8 inches are in use. There are about 30 exits. The ventilation is good. There are connections on each level on the West side with the Never Sweat, on the East side down to the 1,600 foot level with the St. Lawrence, on the South side of the 1,000 and 1,200 foot levels with the Moonlight and on the North side of the 1,050 foot level with the Bell. There are also two air-shafts to the surface on the East side known as Shafts Nos. 5 and 8. No. 5 shaft connects each level down to the 600 and No. 8 shaft connects down to the 900-foot level.

ST. LAWRENCE

John O'Neill, Superintendent; John Collins, Foreman. Employs 645 men underground, 60 topmen and 3 engineers. The main shaft is down 1600 feet, 100 feet having been sunk in 1900, and has three compartments. Electric flash lights are used for call bells. The mine is timbered with 12x12 and 10x10 square sets. There are two double-deck cages with two skips of 8-ton capacity each, a flat steel rope 5-8x8-inches and a Union Iron Works engine 30x72 cylinder. There are about 22 exits and the ventilation is good. On the West side there are connections with the Anaconda down to the 1,400 foot level and on the North side with the Little St. Lawrence down to the 600-foot level. There is also an air-shaft North East of main shaft, known as "311," connecting each level down to the 600 foot level. A Reidler pump having a capacity of 800 gallons per minute is situated on the 1,000 foot level.

NEVER SWEAT.

John O'Neill, Superintendent; John C. Hanley, Foreman. Employs 425 men underground, 50 topmen and 3 engineers.

The main shaft is down 2,000 feet, of which 200 feet was sunk during 1900, and has three compartments. Electric call bells are in use. The mine is timbered with 10x10 square sets. There are two double-deck cages with two 8-ton skips attached. A flat steel rope 1-2x8-inches and a Union Iron Works engine, high and low pressure, 26x72 and 46x72 cylinders are in use. There are 32 exits and the ventilation is good. On the East side there are connections with the Anaconda down to the 1,800 foot level and on the West side with the Colusa-Parrot on the 400, 500, 600, 700, 800, 900, 1,000, 1,100, 1,200 and 1,400 foot levels; also on the West side on the 1,300 and 1,800 foot levels with the Parrot, on the 400 foot level with the Ramsdell-Parrot, on the South side of the 1,200 and 1,600 foot levels with the Moonlight and on the West side of the 600-foot level with the Nipper. There are three Ingersoll-Sergeant air-compressors with a capacity of 250 drills

HIGH ORE.

William Skyrme Superintendent; Charles A. Ferns, Foreman. Employs 180 men underground, 40 topmen and 3 engineers. The main shaft is down 2,200 feet, 500 feet having been sunk during 1,900, and has three compartments. Flash lights are used for call bells. The mine is timbered with square sets and stulls. There are two double-deck cages with a flat steel rope 1-2x7-inches and a Union Iron Works engine, 30x72 in use. There are seven exits and the ventilation is good. On the 700 foot level there is a connection with the Speculator at a point about 1,300 feet North West of shaft. On the 1,200 foot level there is a connection with the West Modoc on the North East side of shaft on the 1,600 foot level; on the West side with the Bell, Green Mountain, Mountain Consolidated No. 1 and Buffalo. There are two Ingersoll-Sergeant air-compressors with a combined capacity of 160 drills. There are two lines of pumps at this mine which pump all of the water from the Anaconda mines on the West side. The station pumps are of the Knowles and Dixon manufacture and are located on the 500, 1,100 and 1,600 foot levels. They are good for 500 gallons capacity and are operated by compressed air.

DIAMOND AND BELL.

James Higgins, Superintendent. These two mines employ 600 men underground, 125 topmen and 6 engineers.

DIAMOND.

John Canfield, Foreman. The main shaft is down 2,200 feet, 400 feet having been sunk during 1900. It has two compartments down to the 1,000 foot level and three compartments from that down. Electric call bells are in use. The mine is timbered with 10x10 square sets. There are two double-deck cages with two 8-ton skips attached. A flat steel rope 1-2x7-inches and a Risdon engine 30x72 cylinder are used. A new steel gallows frame 112 feet high is also in place. There are 16 exits and the ventilation is good. On the 700, 1,100 and 1,300 foot levels the mine is connected with the Gray Rock at a point about 600 feet West of shaft, and on the 600, 700, 900, 1,000, 1,300, 1,400, 1,500 and 1,600 foot levels with the Bell on the East side; also on the 1,300 and 1,600 foot levels with the High Ore on the East side.

BELL.

Daniel Griffin, Foreman. The main shaft is down 1,650 feet and has three compartments. The mine is timbered with 10x10 square sets. There are two double-deck cages in use with a flat steel rope 1-2x6 inches and a Chicago Iron Works engine 20x48 cylinder. There are two Ingersoll-Sergeant air-compressors of 70 drills capacity. There are 15 exits and the ventilation is good. There is a connection on the East side of the 1,300 foot level with the Modoc, on the 1,300 and 1,600 foot levels with the Green Mountain, Mountain Consolidated No. 1 and Buffalo, on the South side of the 1,150 foot level with the Anaconda and on the West side of the 600, 700, 900, 1,000, 1,300, 1,400, 1,500 and 1,600 foot levels.

MOUNTAIN CONSOLIDATED NOS. 1 AND 2 AND
BUFFALO.

James Keegan, Superintendent; Joseph Nevin, Foreman. These mines employ 625 men underground, 95 topmen and 6 engineers.

MOUNTAIN CONSOLIDATED NO. 1.

The main shaft is down 2,000 feet and has three compartments. The mine is timbered with 10x10 square sets. There are two four-deck cages in use with a flat steel rope 1-2x8-inches and a Union Iron Works engine 46x72 and 25x72 cylinders, high and low pressure. There are about 28 exits and the ventilation is good. On the West side there are connections on each level down to the 1,500 with the Mountain Consolidated No. 2 and with the Buffalo on the 400, 500, 600, 700, 800, 900 and 1,500 foot levels on the West side, and on the East side with the Green Mountain on the 1,200, 1,300, 1,400, 1,500, 1,800 and 2,000 foot levels. There is an Ingersoll-Sergeant air-compressor having a capacity of 90 drills.

MOUNTAIN CONSOLIDATED NO. 2.

The main shaft is 1,500 feet deep and has three compartments. The mine is timbered with 10x10 square sets. There are two double-deck cages in use with a flat steel rope 1-2x6-inches and a Dixon engine 20x48 cylinder. There are 21 exits and the ventilation is good. There are connections on the West side with the Buffalo on the 400, 500, 600, 700, 800 and 900 foot levels, and on the East side with the Mountain Consolidated No. 1 on each level.

BUFFALO.

The shaft is down 1,600 feet and has three compartments. This shaft is the air-shaft on the West side. No ore was hoisted during the year. There is a Fraser & Chalmers engine 20x48 cylinder in place.

GREEN MOUNTAIN.

James Keegan, Superintendent; James Brennan, Foreman. Employs 189 men underground, 30 topmen and 3 engineers. The main shaft is down 2,200 feet and has three compartments. There are two four-deck cages in use with a flat steel rope 3-4x7-inches and a Webster, Camp & Lane engine, 30x72 cylinder. There are 10 exits and the ventilation is good. There are

connections with the Mountain Consolidated No. 1 on the West side of the 1,300, 1,400, 1,500, 1,600, 1,900 and 2,100 foot levels; on the 1,600 foot level on the South side with the High Ore and Bell on the East and the Mountain Consolidated and Buffalo on the West and also on the 1,000 foot level with the Wake Up Jim. There are two Ingersoll-Sergeant air-compressors of 35 drill capacity on the 2,200 foot level. There is a Knowles steam pump of 1,000 gallons capacity.

THE BOSTON AND MONTANA COMPANY.

The mines operated and owned by this company are the Mountain View, Pennsylvania, Moose, Leonard, East Colusa, West Colusa and Shafts Nos. 4 and 5 on Meaderville flat, all of which were in operation during the year 1900. In and about the mines of this company 1,394 men are employed. There are safety gates on all the cages in use. Safety appliances are tested once each week. The ore is copper with silver as a by-product. Frank Klepětko is the General Manager; C. S. Batterman is Superintendent and B. H. Dunshee is assistant Superintendent.

MOUNTAIN VIEW.

Richard Dawe, Foreman. Employs 185 men underground, 90 topmen and 3 engineers. The main shaft is down 1,700 feet, 100 feet having been sunk during 1900, and has three compartments. There are two double-deck cages in use, a flat steel rope 3-8x5-inches and an E. P. Allis engine, 18x48 cylinder. Electric call bells are in use. The mine is timbered with 10x10 square sets. There are 15 exits and the ventilation is good. There are connections with the Rarus, Leonard and West Colusa. A Rand air-compressor of 25 drills capacity is in use.

PENNSYLVANIA.

Stephen Williams, Foreman. Employs 205 men underground 23 topmen and 3 engineers. The main shaft is down 1,400 feet, 300 feet having been sunk in 1900, and has three compartments. Flash lights are used for call bells. The mine

is timbered with 10x10 square sets. There are two double-deck cages with a flat steel rope 1-2x5-inches and an E. P. Allis engine, 18x48 cylinder. There are four exits. The ventilation is poor in the lower levels. On the East side of the 600 foot level there is a connection with the Silver Bow No. 1. There is an air shaft 450 feet North West of main shaft that connects down to the 300-foot level and on the 100-foot level there is a connection with the Michael Devitt. An air compressor of 15 drill capacity is in use.

MOOSE.

William Hastie, Foreman. Employs 16 men underground, 5 topmen and one engineer. The shaft is down 300 feet and has three compartments. The mine is timbered with stulls. The ore is silver. There is a single-deck cage in use with a round rope (1-inch) and an Ottumwa engine 10x12 cylinder. There are five exits and the ventilation is good. There is an air shaft 300 feet West of main shaft that connects down to the 200-foot level. At a point about 525 feet West of main shaft there is a connection on each level with the old Moose shaft; also on the 300-foot level at a point about 400 feet West of shaft with the Amador mine.

LEONARD.

W. Corbett, Foreman. Employs 210 men underground, 220 topmen and 3 engineers. The main shaft is down 1,200 feet, 100 feet having been sunk in 1900 and has three compartments. Flash lights are used for call bells. There are two double-deck cages in use with a flat steel rope 1-2x5-inches and an E. P. Allis engine, 20x60 cylinder. There are eight exits and the ventilation is good. On the South side of the 300 and 600-foot levels there are connections with the Minnie Healey, on the West side of the 600, 700, 800 and 900-foot levels with the West Colusa and on the East side of the 600-foot level with the East Colusa. There is a Reidler pump on the 700-foot level having a capacity of 900 gallons per minute. There is also a Norberg air-compressor of 75 drill capacity.

WEST COLUSA.

A. A. Abbott, Foreman. Employs 275 men underground, 31 topmen and 3 engineers. The main shaft is down 1,300 feet, 200 feet, having been sunk during 1900 and has 3 compartments. Flash lights are used for call bells. The mine is timbered with 12x12 and 10x10 square sets. There are two single-deck cages of two car capacity in use with a flat steel rope 1-2x5-inches and a Norberg engine, 20x60 cylinder. There are seven exits and the ventilation is fair. There is a Norberg pump on the 1,000-foot level having a capacity of 400 gallons. The powder house is on the 700-foot level 300 feet South West of shaft.

EAST COLUSA.

W. Corbett, Forman. Employs 71 men underground, 6 topmen and three engineers. The main shaft is down 900 feet and has three compartments. Flash lights are used for call bells. The mine is timbered with 12x12 and 10x10 square sets. There are two single-deck cages in use with a 1-inch round rope and a Lidgerwood engine 8x10 cylinder. There are four exits and the ventilation is good. At a point about 175 feet East of shaft there is an air shaft that connects down to the 300-foot level and on the West side of the 600-foot level with the Leonard and West Colusa.

SHAFT NO. 4.

L. J. Fisher, Foreman. Employs 8 men underground, 2 topmen and 2 engineers. The shaft is down 200 feet, all of which was sunk during the year. It has two compartments. Sinking was in progress at the date of inspection. A single-deck cage with an inch round rope and a Fairbanks engine 8x10 cylinder are used. There is but one exit—the main shaft. The ventilation is good. The only work in progress is the sinking of the shaft, 8x8 timbers are used.

SHAFT NO 5.

L. J. Fisher, Foreman. Employs 19 men underground (two topmen and three engineers. The main shaft is down 275 feet, all of which was sunk this year, and has two compartments.

There is a bucket and crosshead used with a round 3-4-inch rope and a Lidgerwood engine 8x10 cylinder. There is but one exit—the main shaft. The ventilation is good. The only work in progress is the sinking of the main shaft.

MONTANA ORE PURCHASING COMPANY.

This company has operated the Rarus mine during the past year. John MacGinniss is Manager; G. H. Robinson is Superintendent and N. Treloar is Foreman. Employs 370 men underground, 35 topmen and three engineers. The main shaft is down 1,200 feet and has three compartments. The ore is copper and silver. Electric flash lights are used for call bells. There are two double-deck cages in use with safety doors and a flat steel rope 3-8x6-inches and a Webster, Camp & Lane engine 20x48 cylinder. Safety appliances are tested each week. There are 15 exits and the ventilation is good. On the 150-foot level there are three air-shafts to the surface. There are connections with the Mountain View on the West side of the 450, 500, 700 and 800-foot levels on the East side of the 450 and 500-foot levels with the Michael Devitt; also on the 450 level with the Berkeley and Snohomish mines on the East side and also on the 800 level with the Minnie Healey. A Rand air compressor of 50 drills capacity is in use.

COLORADO MINING AND SMELTING COMPANY.

GAGNON.

R. F. Pearce, General Manager, W. F. Word, Superintendent. E. A. Wayne, Foreman. Employs 268 men underground, 45 topmen and 3 engineers. The main shaft is down 1,800 feet, 100 feet having been sunk in 1900 and has three compartments. It is on an incline of 74 degrees. Electric call bells are used. The ore is copper and silver. The mine is timbered with square sets and stulls. There are two skips used with a round 1 and 1-8 inch rope and a Dixon engine 22x48 cylinder. Safety appliances are tested each week. There are two exits and the ventilation is good. There is an air shaft about 750 feet West of main shaft connecting each level down to the 1,800 foot level with raises in the footwall. A Rand air compressor of 10 drill capacity is in use.

BUTTE & BOSTON COMPANY.

The mines operated by this company during the year 1900 were the Silver Bow Nos. 1 and 3, East Gray Rock, Blue Jay, Berkeley and shaft No. 6 on Meaderville flat. The mines are all copper with silver as a by-product. The cages of the company are equipped with safety doors. The company employs 579 men in and around the mines. Frank Klepetko is general manager and John Gillie, superintendent. Safety appliances are tested once each week.

SILVER BOW NO. 1.

W. E. Kane, Foreman. Employs 125 men underground, 30 topmen and 3 engineers. The main shaft is down 1,000 feet and has three compartments. Electric flash lights are used for call bells. There are two single-deck cages with safety doors with a flat rope 3-8x4-inches and an E. P. Allis engine, 16x42 cylinder. There are nine exits and the ventilation is good. There are connections with the Silver Bow No. 2 on the 300, 400, 500 and 700-foot levels at a point about 750 feet East of the main crosscut. On the 500-foot level there is an air shaft to surface that connects each level at a point about 175 feet West of shaft. On the 400-foot level there is a connection with the Berkeley at a point about 400 feet North of No. 2 shaft. On the 700-foot level there is a connection with Silver Bow No. 3 at a point 500-feet South of main shaft, and on the 800-foot level with the Pennsylvania on the West side. On the 1,000-foot level there is a Reidler pump having a capacity of 900 gallons per minute.

SILVER BOW NO. 3.

W. E. Kane, Foreman. Employs 55 men underground, 15 topmen and 3 engineers. The main shaft is down 575 feet, 200 feet having been sunk during 1900. This shaft has four compartments. Electric flash lights are used for call bells. The mine is timbered with 10x10 square sets. There are two single-deck cages with safety doors, a flat steel rope 1-2x4 1-2 inches and a Risdon engine 12x14 cylinder. There are four exits and the ventilation is good. On the 275-foot level there is an

air shaft about 200 feet West of shaft to the surface and on the 575-foot level there is a connection with the Silver Bow No. 1 at a point about 500 feet North of shaft. On the 575-foot level there is a compound Knowles station pump having a capacity of 500 gallons per minute.

EAST GRAY ROCK.

William Williams Foreman. Employs 130 men underground, 45 topmen and 3 engineers. The main shaft is 1,600 feet deep and has three compartments. The mine is timbered with 10x10 square sets. Electric flash lights are used for call bells. There are two doubledeck cages in use with safety doors a flat steel rope 1-2x6 1-2 inches and a Chicago Iron Works engine, 20x48 cylinder. Safety appliances are tested each week. There are four exits. On the 300-foot level there is a connection with the Penrose shaft at a point about 500 feet West of the main shaft. On the 700-foot level there is a connection with the West Gray Rock about 1,200 feet West of shaft. On the 1,400-foot level there is a connection with the Bell on the North vein at a point about 200 feet East of main cross-cut. A Knowles station pump is located on the 1,600-foot level. It has a capacity of 300 gallons. A Norberg air-compressor of 18 drills capacity is in use.

BLUE JAY.

J. Knight, Foreman. Employs 82 men underground, 10 topmen and 3 engineers. The main shaft is down 1,075 feet on an incline of 72 degrees. It has two compartments down to the 600-foot level and three compartments from that down. There are two single-deck cages made to conform to the incline with a round 1-inch rope and a Griffith & Wedge engine 16x32 cylinder. Electric call bells are in use. The mine is timbered with 10x10 square sets and stulls. Safety appliances are tested each week. There are four exits and the ventilation is good. There is an air shaft about 25 feet East of shaft that connects each level down to the 600-foot level; also on the 700 and 900-foot levels there are connections with the Moonlight about 125 feet East of shaft. An Ingersoll-Sergeant air-compressor of 5 drill capacity is in use.

BERKELEY.

Edward Finnigan, Foreman. Employs 42 men underground, 18 topmen and 3 engineers. The main shaft is down 900 feet, 250 feet having been sunk during 1900, and has three compartments. Electric flash lights are used for call bells. The mine is timbered with 10x10 square sets. There are two single-deck cages in use with safety doors, a round 1-inch rope and a Griffith & Wedge engine 18x32 cylinder. Safety appliances are tested each week. There are 13 exits and the ventilation is good. On the 400-foot level there are connection with the Silver Bow No. 2, also with the Rarus, Snohomish and Michael Devitt and on the 600-foot level with the Rarus.

SHAFT NO. 6.

This shaft is located on Meaderville flat. R. D. Angrove, Foreman. Employs 8 men underground, 2 topmen and 2 engineers. The main shaft is down 400 feet all of which has been sunk during 1900. It has two compartments. The shaft is timbered with 8x8 timbers. There is a single-deck cage in use with a round 7-8-inch rope and a Webster, Camp & Lane engine, 7x10 cylinder. The only work in progress is the sinking of the shaft. The ventilation is good.

WASHOE COPPER COMPANY.

The only mine worked by this company during the year 1900 was the Moonlight. Wm. Scallon is general manager and Wm. Skyrme superintendent. A total of 163 men are employed at this mine.

MOONLIGHT.

James Stevens, Foreman. Employs 118 men underground, 42 topmen and 3 engineers. The main shaft is down 1,300 feet and has three compartments. Flash lights are used for call bells. The ore is copper and silver. There are two double-deck cages in use with safety doors. There is a flat steel rope 1-2x6-inches and a Dixon engine, 20x48 cylinder. Safety appliances are tested each week. There are 6 exits and the ventilation is good. There are connections on the 700 and 900-

foot levels with the Blue Jay about 1,200 feet West of shaft, on the 900 and 1,300-foot levels with the Never Sweat at a point about 300 feet South West of shaft, and on the 900-foot level there is a connection with the Anaconda at a point about 1,600 feet South East of shaft. There are two air compressors of 50 drills capacity of the Ingersoll-Sergeant make.

THE PARROT MINING COMPANY.

During the year 1900 the mines operated by this company were the Little Minah and Parrot. H. A. Gallwey is superintendent and manager. Employs 331 men. The ore is copper and silver.

LITTLE MINAH.

T. M. Lynch is foreman. Employs 30 men underground, 10 topmen and 3 engineers. The main shaft is down 800 feet and has two compartments. The mine is timbered with 10x10 square sets. There is one single-deck cage in use with safety doors. A round 1-inch rope and a Montana Iron Works engine 12x36 cylinder is in use. Safety appliances are tested each week. There are four exits and the ventilation is good. There is an air shaft 75 feet East of main shaft that connects down to the 150-foot level. There is also a connection on the 600-foot level with the Nipper at a point about 900 feet East of shaft. There is also a connection on the same level with the Little Nipper about 850 feet East of shaft.

PARROT.

T. M. Lynch, Foreman. Employs 170 men underground, 115 topmen and 3 engineers. The main shaft is down 1,600 feet, 400 feet having been sunk in 1900, and has three compartments down to the 400 and from there down it has four compartments. Electric flash lights are used for call bells. 10x10 square sets are used. There are two double-deck cages in use with safety doors. A flat steel rope 1-2x6 inches and a Fraser & Chalmers 22x60 engine are in use. Safety appliances are tested each week. There are 10 exits and the ventilation is good. On the East side of the 700, 800, 900 and 1,000-foot levels there

are connections with the Colusa-Parrot; on the 1,000 and 1,600 levels there are connections with the Never Sweat on the East side and with the Nipper on the 1,000-foot level at a point about 130 feet North of shaft; also on the same level with the Original No. 6 at a point about 900 feet West of shaft. There is an air shaft about 175 feet East of shaft that connects down to the 400-foot level and there is also an air shaft on the West side about 150 West of shaft that connects down to the 600-foot level.

COLUSA-PARROT COMPANY.

The mines operated by this company during 1900 were the Original Colusa-Parrot and Stewart. Charles W. Clark is general manager and Thomas Bryant, superintendent. These mines are copper with silver as a by-product. This company employs 533 men in and about the mines.

ORIGINAL.

Joseph Bryant, Foreman. Employs 170 men underground, 13 topmen and 3 engineers. The main shaft is 1,200 feet deep, 100 feet having been sunk in 1900, and has two compartments down to the 1,100-foot level. Electric call bells are used. The mine is timbered with 10x10 square sets. There is a skip and a double-deck cage in use with safety doors. The equipment comprises a round 1 1/8-inch rope an E. P. Allis engine 18-36 cylinder, and an air-compressor with a capacity of 10 drills. Safety appliances are tested once each week. There are three exits and the ventilation is good. There is an old incline shaft that connects each level down to the 1,100. Then there is an air shaft 600 feet East of main shaft that connects down to the 300-foot level.

COLUSA-PARROT.

Thomas Kilgallon, Foreman. Employs 180 men underground, 12 topmen and 3 engineers. The main shaft is down 1,400 feet and has two compartments from the 300-foot level to the bottom. Electric call bells are in use. 10x10 square sets are used. A skip and a double-deck cage are in use with safety

doors. There is a flat steel rope 1-2x4 1-2 inches and a Montana Iron Works engine 16x30 cylinder. Safety appliances are tested each week. There are 14 exits and the ventilation is good. There is a connection on the West side with the Parrot on the 800, 1,100 and 1,200-foot levels, on the East side with the Never Sweat on the 300, 400, 700, 800, 1,000, 1,100, 1,200 and 1,300-foot levels; and also on the East side with the Ramsdell-Parrot on the 400 and 500-foot levels. A Rand air-compressor of 15 drills capacity is in use.

STEWART.

Wm. Bailey, Foreman. Employs 140 men underground, 9 topmen and 3 engineers. The main shaft is down 1,000 feet and has two compartments. It has an incline of 72 degrees. Electric call bells are in use. For timbering 10x10 square sets are used. The equipment consists of a skip and a double-deck cage, a round 1 1-8-inch rope and an E. P. Allis engine 16x30 cylinder. Safety appliances are in use and are tested each week. There are three exits and the ventilation is good. There is a connection with the Nipper on the 500-foot level at a point about 400 feet East of shaft. There is also an air shaft about 300 feet South East of shaft that connects each level. A Rand air-compressor of 15 drill capacity is in use.

ALICE GOLD & SILVER MINING & MILLING COMPANY.

The mines operated by this company during 1900 were the Alice, Blue Wing, Magna Charta, and Valdemere. T. W. Buzzo is general manager and superintendent. The ore is gold and silver. In and about the mines 76 men are employed.

ALICE.

Thomas Williams, Foreman. Employs 20 men underground, 2 topmen and one engineer. The main shaft is down 1,500 feet and has three compartments. It is only worked down to the 500-foot level. There are two single-deck cages (one with safety doors) in use. There is a round rope 1-2x4-inches, a Fraser & Chalmers engine 18x48 cylinder in use. Safety appliances are tested each week. There are four exits and the ventilation is good. On the 100-foot level there is a connection with the

Moulton at a point about 700 feet West of shaft; also on the same level there is an air shaft about 250 feet East of shaft, and on the 200-foot level there is an air shaft 600 feet South of main shaft. A Rand air-compressor of 25 drills capacity is in use.

BLUE WING.

T. Williams, Foreman. Employs 8 men underground, 2 topmen and one engineer. The main shaft is down 650 feet and has two compartments. The mine is timbered with stulls. There is one single-deck cage with safety doors, a round 1-inch rope, a Griffith & Wedge engine 11x14 cylinder. Safety appliances are tested each week. There are four exits and the ventilation is good. There are two air shafts, one on the East side and one on the West side.

MAGNA CHARTA.

T. Williams, Foreman. Employs 20 men underground, 2 topmen and one engineer. The main shaft is down 700 feet and has three compartments. The mine is timbered with stulls. There are two single-deck cages in use, one of them being supplied with safety doors. There is a round 1 1/8-inch rope, a Griffith & Wedge engine 12x16 cylinder and an Ingersoll-Sergeant air-compressor of 7 drills capacity. There are 3 exits and the ventilation is good. There is a tunnel that connects the 100-foot level on the West side and on the East side of the same level there is an air shaft about 800 feet East of shaft.

VALDEMERE.

T. Williams, Foreman. Employs 17 men underground, one topman and one engineer. The main shaft is down 275 feet and has three compartments. Stulls are used. There is one single-deck cage in use with 1-inch rope and 12x14 engine. There are four exits. Ventilation is good.

MISCELLANEOUS MINES.

SMOKEHOUSE.

This mine is owned and operated by the Smokehouse Company. Bernard Noon is general manager. W. W. Wishon is Superintendent. Cy Bell, Foreman. Employs 9 men underground, 3 topmen and 2 engineers. The main shaft is down 400 feet, all of which has been sunk during 1900 and has two compartments. There is a round 1-inch rope with a single-deck cage and an electric engine of 70-horse power in use. Safety appliances are tested often. There is but one exit—the main shaft. The only work in progress is the sinking of the shaft. An Ingersoll-Sergeant air-compressor of 3 drills capacity is in use.

ELLA.

This mine is owned and operated by the Butte Consolidated Mining Company. E. H. Renisch is Superintendent and Manager. G. G. Powell Foreman. Employs 12 men underground, 6 topmen and 3 engineers. The main shaft is down 500 feet, 200 feet having been sunk during 1900, and has two compartments. The mine is timbered with square sets and stulls. The ore is gold and silver. There is a single-deck cage with safety doors, a flat rope 1-2x4 inches and a Prescott-Scott engine 10x16 cylinder in use. Safety appliances are tested every two weeks. There is but one exit—the main shaft. The shaft house is back 45 feet from the shaft. The ventilation is fair.

MINNIE HEALEY.

This mine is owned by the Montana Ore Purchasing Company and others and is being worked by Receiver E. H. Wilson, who is Superintendent and general manager. John P. Kane, Foreman. Employs 75 men underground, 10 topmen and 3 engineers. The main shaft is down 800 feet, 200 feet having been sunk in 1900, and has two compartments. The mine is timbered with 10x10 square sets. The ore is copper and silver. There is a double-deck cage with safety doors and

a round 1 and 1-8-inch rope and an Ottumwa engine 16x20 cylinder in use. Safety appliances are tested once each week. There are 6 exits and the ventilation is good. On the 300 and 600-foot levels there are connections with the Leonard on the North side and also on the 600-foot level with the Rarus and Tramway mines.

BRITTANIA.

This mine is owned and operated by G. R. Nickey & Co. Mr. Nickey is superintendent and general manager. William Jenkins is foreman. Employs 15 men underground, 2 topmen and 2 engineers. The main shaft is down 250 feet, 100 feet having been sunk during 1900, and has two compartments. The mine is timbered with stulls. The ore is gold and silver. There is a round 7-8-inch rope with a single-deck cage and a Lidgerwood engine 8x10 cylinder in use. Safety appliances are tested each week. There are three exits and the ventilation is good. On the West side of the 100-foot level there is an air shaft about 250 feet West of shaft. On the same level there is a raise to the surface about 300 feet East of shaft. There is an Ingersoll-Sergeant air-compressor of 5 drill capacity in use.

NIPPER.

This mine is owned by the M. O. P. Co. and others and is being worked by a Receiver. Thomas McLaughlin who is also superintendent and general manager. Henry Hurley, Foreman. Employs 175 men underground, 32 topmen and 6 engineers. The mine is worked through two shafts Nos. 1 and 2. No. 2 shaft is down 800 feet all of which has been sunk in 1900. It has two compartments and is on an incline of about 60 degrees. It is worked by a skip with a round 1 1-4 inch rope, a Fraser & Chalmers engine 20x60 cylinder. Electric flash lights are used for call bells. The ore is copper and silver. The mine is timbered with 10x10 square sets. Safety appliances are tested each week. There are 12 exits and the ventilation is good. There are connections with No. 1 shaft on the 40, 100, 250, 500 and 800-foot levels at a point about 250

feet East of shaft; also on the 40-foot level with the Blue X about 300 feet North West of shaft; also on the 500-foot level with the Stewart about 400 feet South West of shaft; also on the same level with the Little Minah about 700 feet West of shaft, and on the 1,100-foot level with the Parrot and Never Sweat at a point about 750 feet south of shaft. There are 2 Rand air-compressors of 20 drill capacity.

SPECULATOR.

Owned and operated by the Largey estate. John Dougherty is manager. W. W. Wishon superintendent; Pat Sheehan, foreman. Employs 120 men underground, 25 topmen and 3 engineers. The main shaft is down 1,200 feet, 600 feet having been sunk during 1900 and has three compartments. Electric flash lights are used for call bells. The ore is copper and silver. There are two double-deck cages in use having safety doors attached. A flat steel rope 5-8x6-inches and a Webster. Camp & Lane engine 20x48 cylinder, are also in use. Safety appliances are tested each week. There are five exits and the ventilation is good. On the 400, 700, and 900-foot levels there are connections with No. 1 shaft on the West side at a point about 200 feet from the shaft; also on the 700-foot level there is a connection with the High Ore at a point about 40 feet above the main level on the East side. An Ingersoll-Sergeant air-compressor of 16 drill capacity is also in use.

ADIRONDACK.

This mine is owned by James Murray and is operated under lease by Conroy & Co. P. Delmas is in charge. Employs 6 men underground, 2 topmen and 2 engineers. The main shaft is down 475 feet of which 275 feet were sunk during 1900, and has two compartments. The mine is timbered with square sets and stulls. The ore is copper and silver. There is a single-deck cage in use with a round 7-8 inch rope, a Fraser & Chalmers engine 8x10 cylinder in use. Safety appliances are tested each week. There are two exits and the ventilation is good. On the 200-foot level there is a connection with an air-shaft about 100 feet East of main shaft. A Rand air-compressor of three drill capacity is in use.

MONITOR.

Owned by the Anaconda Company. Is under lease to Michael O'Farrell who is superintendent and manager. J. A. Harrington is foreman. Employs 25 men underground, 2 topmen and 3 engineers. The main shaft is down 200 feet and has two compartments. The mine is timbered with stulls. The ore is copper and silver. There is a single-deck cage with a round 7-8-inch rope and an Ottumwa engine 8x10 cylinder in use. Safety appliances are tested each week. There are 3 exits and the ventilation is good. On the 200-foot level there is a connection with the J. I. C. at a point about 140 feet West of main crosscut and on the 100-foot level there is a connection with the Ground Squirrel, 200 feet West of main crosscut.

DUTTON MINE.

This mine is owned by C. E. Dutton and is operated under lease by Pat Wall & Co. Mr. Wall is in charge. Employs 32 men underground, 2 topmen and 2 engineers. The main shaft is down 165 feet, all of which was sunk during 1900, and has two compartments. The ore is copper and silver. The mine is timbered with stulls. An electric engine of 15-horse power with a round 7-8 inch rope is in use. There is but one exit—the main shaft and the ventilation is good. The shaft house is back 45 feet from the shaft.

BEAVERHEAD COUNTY

ATLANTIS.

Owned and operated by the Hecla Company. Henry Knippenberg is general manager; S. A. Barber is superintendent and Alex McDonald is foreman. Employs 15 men. This mine is worked through a shaft on an incline of 25 degrees and is down 600 feet. A 1 and 1-8-inch round rope of manilla a car and a Fraser & Chalmers engine 8x10 are used. The mine is timbered with stulls. There are 5 exits and the ventilation is good. The ore is gold and silver.

CLEVE.

Owned and operated by the Hecla Company. John Hull is foreman. Employs 35 men. The ore is gold and silver. The mine is worked through an incline shaft of about 35 degrees with a Manila rope 1 and 1-2-inches, a car and a Fraser & Chalmers engine 8x10. The incline is down 700 feet. There are 3 exits and the ventilation is good. The mine is timbered with stulls.

ACCIDENTS.

Thomas Martin, a driver in the Anaconda Copper Mining Company's coal mines at Belt, met with almost instant death on December 16th, 1899, by having his head crushed between a car on which he was riding and a prop. From the testimony given at the coroner's inquest it appears that Martin hitched the animal he was driving to a loaded car and started to haul the car out of the room, he riding on the front end of the car. Almost immediately on starting he looked back to examine if the wheels were properly spragged before going down grade. This was his position when his head was caught between a prop supporting a portion of the roof and the car. The coroner's jury rendered a verdict that the accident was due to his own carelessness.

Fred Buslett, a machine helper, employed at the Anaconda Copper Mining Company's coal mines at Belt, sustained injuries by a fall of coal in room 38, tenth south entry, from which he died six weeks later. The accident occurred on the morning of January 14th. The night shift had fired some shots in this room previous to quitting work. The day shift, on coming to work neglected to make an examination as to whether the roof and coal in the place they were going to work, had been shaken or disturbed by the shots fired by the night shift, taking it for granted that the place was safe from appearances. They had not been working ten minutes when the coal gave away, the greater part of it falling on Buslett, breaking his back and causing his death six weeks later.

James Lewis, a miner in the Lowash mine of the Bear Gulch Mining Company, of Jardine, Park County, fell into a chute while retreating from the shots which he was exploding on

the afternoon of April 6th and was instantly killed. The chute into which Lewis fell was partly covered with plank lagging and was the regular traveling way for him and others between the ladderway leading to the level and their working places. The accident was due altogether to his light going out as he approached the chute, and having ignited the fuse of several shots from which he was trying to escape, he was in fear of taking the time to relight his candle. The coroner's jury exonerated the management from blame.

Nelson Larson, a miner, met with a violent death by an explosion in the face of a tunnel he was driving on the Iron Chancellor claim at Gilt Edge, Fergus County, on the 28th day of April. Owing to the fact of the victim being alone when the accident occurred no information could be learned, other than his friends finding that he did not return to his boarding place at the usual time in the evening repaired to the tunnel where he was employed and found him lying close to the face of the funnel badly lacerated from the effects of several drill hole shots.

On the morning of May 13th, Ole Mohlstad, was given employment as laborer and carman at the Bald Mountain mine, Marysville. He was taken in charge by the shift boss and taken down the shaft to the 100-foot level and into a drift where he was shown and instructed regarding the work he was to perform. Mohlstad decided that he would not work there on account of the place being very wet and proceeded to go on top. He was accompanied to the station by the shift boss, John Clancey who, after Mohlstad had stepped aboard the cage, rang the usual signal to hoist to the top with men in the cage. The cage could not have traveled to exceed fifty feet in its ascent (according to Clancey's testimony) when the body of Mohlstad came tumbling down the shaft, he in some unaccountable manner having fell off. An examination of the shaft showed it to be in perfectly safe condition and nothing to indicate a possible obstruction to the cage. The engine is not capable of hoisting fast and the cage used is by several square feet the largest of any quartz mine in this state. I am inclined to believe that the accident was due to the victim not being accustomed to riding on a cage and that he became faint

and dizzy in consequence of which he stumbled off the cage and into the pump compartment of the shaft.

Thomas W. Thomas, a miner, employed in the mines of the Montana Coal & Coke Company, at Aldridge, met a frightful death on the morning of August 3rd. At the time of the accident he was engaged in making a crosscut between the main No. 2 slope level and the air course. The roof at one side of the point he was working was extremely bad, of which fact he was aware, as some of the other workmen had pointed it out to him. He thought, however, it was safe enough for his shift and refused the suggestion made by the others to put a prop under it. This overconfidence cost him his life as at about 3:30 a. m. while loading a car the great mass of rock fell crushing him beneath it.:

On the afternoon of October 29th, between the hours of 1 and 3 p. m., W. C. Whitmore, Charles Blackie and Robert Campbell, three of the best and most favorably known miners in the state, came to their deaths in the shaft of the Smoke-house lode by suffocation. These three comprised one of the crews sinking the shaft and were on the morning shift. In the forenoon they finished drilling a round of machine holes fifteen in number, at 11:45 blasting and going on top for lunch, returning to work at 12:50. On reaching the bottom of the shaft they proceeded to connect the suction with the pump, which only required the tightening of four bolts, but which they never lived to complete. Nothing was heard from them from this time by either the foreman who was in the 200-foot level, or the engineer on top. This fact aroused no apprehension in their minds as to the safety of the men in the shaft, because it often happens that timbers are displaced, or the pump more or less injured by rock hurled from a heavy blast, and frequently considerable time is taken up in repairing the damage caused in this way before the ordinary work can proceed. At 2:45 the foreman was lowered to the bottom of the shaft to inspect the work and found the three men lying on the bottom, faces downward, almost covered with water. They were brought to the surface as quickly as possible and Drs. Hanson and Clarkson hastily summoned to make an examination. Blackie and Campbell were immediately pronounced lifeless. Whitmore exhibited faint signs of life for a short time only. The

coroner's inquest, which was held on the bodies to inquire into the cause of death was most searching. The witnesses, including Drs. Hanson and Clarkson, an expert electrician, Mr. Hebgen, the Superintendent of the mine, Mr. Wishon, who is both a mining engineer and chemist, and the engineers and miners employed at the mine. The dynamite used at the mine was analyzed to determine the kind of gasses produced by combustion and their effect on life. The analysis showed that among other gases this dynamite (Repauno Gelatine) produces a dangerous, irrespirable gas, nitros oxide, as much as 6 per cent, and unlike many other gases which are met in the mines, a candle will frequently burn where it may be present in sufficient volume to endanger life. The witnesses, both expert, and practical, agreed that these men's death was brought about by their becoming unconscious from the effects of the gas, followed by falling in the water and being drowned. This was the view adopted by the coroner's jury in their verdict. After a thorough investigation of the facts and listening to and participating in the coroner's inquiry, I approve of the conclusion arrived at by the jury.

Thomas Glendennon, a miner employed at the Lucky Joe mine, Lewis and Clarke Company, came to his death on the 29th day of October by an explosion of dynamite. The circumstances attending this accident should serve as a warning and tend to put a stop to the dangerous practice, rather common among miners, viz: That of carrying powder and fuse having blasting caps attached, loose in their arms or hands, and a lighted candle at the same time. The death of Thomas Glendennon was occasioned by his following the above bad practice. The accident occurred near midnight. Glendennon went to the place where the shift's supply of powder was kept and prepared several fuses and got powder to charge a number of holes. While returning in the tunnel, and near the face, the explosion took place. His partner, Benjamin Blake, testified that he saw Glendennon as he was nearing the face of the tunnel and that he observed that he had the powder and fuse loose on his arm and a lighted candle in his hand. From this circumstance the explosion can be accounted for in that the flame of the candle came in contact with either the flame or caps.

Guinseppe Morello fell from the bucket on which he was riding on the morning of October 30th and was killed. The accident happened in No. 5 shaft of the Boston and Montana Company at Butte. Morello and two others were descending the shaft and had been lowered 170 feet when the bucket struck one side of the shaft, causing it to tip slightly. The jar and the momentary tendency of the bucket to overturn, as a result of it striking the timbers caused Morello to lose his hold on the rope and fall down the shaft a distance of 130 feet.

Joseph Delahanty, a driver employed in No. 1 mine of the Cottonwood Coal Co. at Stockett, received injuries on November 23, which resulted in death on the 30th. The unfortunate man was bringing a trip of cars to the first north parting, riding on the first car, and nearing the end of his run jumped, stumbled and fell under the car.

FATAL ACCIDENTS.

Silver Bow County.

John Kielty, a miner employed at the Diamond mine, was instantly killed on Dec. 6th, 1899, on the 1000 foot level of the Bell shaft. The machinery at the Diamond was broken so the men were obliged to go to the Bell to be hoisted to the surface. The engineer did not use the proper signal but used short bells. When Kielty was stepping on the cage the engineer lifted it without the signal and Kielty was caught between the cage and the wall plates, crushing the life out of him. The coroner's jury found that Engineer John J. Kane was to blame for the accident.

Michael J. Driscoll, a miner employed at the Never Sweat received injuries at the 6th floor of the 1600-ft level by a cave of ground on Dec. 17th, 1899, that he died on Dec. 18th. The coroner's jury found that it was an unavoidable accident.

Patrick Joyce, a miner employed at the St. Lawrence mine, was instantly killed by a fall of ground on Dec. 24, 1899 on the 5th floor of the 1200-ft level. The jury found that it was unavoidable.

Edward Perron, a shoveller employed at the Parrott mine was instantly killed on the second floor of the 900 foot level on

Dec. 30th, 1899, by a fall of rock. The jury found that it was unavoidable.

Thomas Bilbow and Mike Piano, two miners employed at the Never Sweat, were instantly killed by a blast on Jan. 6th, 1900 on the 1800-ft level of the West drift. They had a round of holes, 9 in number to fire. They had trouble in spitting the second hole and it took so much time that when they had all the holes spit, the first one went off, killing them instantly. The jury found that it was unavoidable.

Mike Sullivan and Thomas Smith, two miners employed at the Mountain Con. No. 1, were instantly killed by an explosion on Jan. 13, 1900, in the East drift of the 1700-ft level. They had 8 holes to fire. There were also two miners working behind them about 60 feet. They had 5 holes to fire. They all fired together, but before Sullivan and Smith could reach the raise the holes began to explode, so they were cut off. The jury decided it was unavoidable.

Joseph H. Maxwell and Joseph Milonovich, two miners employed at the Colusa- Parrot mine were instantly killed on the East drift of the 1400-ft level, Jan. 14, 1900, by an explosion. The coroner's jury decided that the accident was unavoidable.

Henry Jeffery, a car man employed at the Moose mine, was instantly killed by a fall of rock on the 300-ft level on Feb. 22, 1900. The jury decided that the accident was unavoidable.

Milton Kerr, a miner employed at the Moonlight mine, received injuries by a fall of rock on Feb. 23, 1900 on the 4th floor of the 900-ft level that he died from said injuries on Feb. 28, 1900. The jury found that the accident was unavoidable.

Jerry Murphy, a station-tender at the Parrot mine was instantly killed on March 24, 1900 by being caught between the cage and the wall-plates on the 700-ft level. The jury found that his death was caused by his own carelessness.

Edward Fogerty, a carman employed at the Never Sweat, was instantly killed by falling down the shaft from the 1800-ft level to a point about 50 feet below on June 10, 1900. The coroner's jury found that the accident was unavoidable.

Edward Cavanaugh, a miner employed at the Mountain Con. No. 1. was almost instantly killed by walking into a chute on the 4th floor of the 1700-ft level on June 11, 1900. The jury decided it was accidental.

P. C. Dinman, a miner employed at the Gagnon mine, was instantly killed on June 14, 1900 on the 4th floor of the 1400-ft level by an explosion of a box of caps. The jury found that it was an unavoidable accident.

Edward Young, a miner employed at the Original mine, was instantly killed on the 2nd floor of the 800-ft level on June 27, 1900 by a fall of rock. The jury decided that it was an accidental death.

Martin L. Dunlevy, a station tender employed at the Anaconda mine was killed by falling down No. 1 shaft from the 500-ft level to the 600 foot level on July 19, 1900. The jury found that it was an accidental death.

Thomas Cashion, a miner employed at the High Ore mine was killed by a fall of rock on July 24, 1900, on the 11th floor of the 1600-ft level. The coroner's jury found that he came to his death through his own carelessness.

Pat Murphy, a carman employed at the Diamond mine, was instantly killed by a blast on Aug. 4, 1900 on the 3rd floor of the 900-ft level. The jury decided that no one was to blame.

Tom Kelly and James J. Murray, two miners employed at the Stewart mine, were instantly killed by the explosion of a box of powder on Sept. 14, 1900. The jury found that it was accidental.

Bernard McDonald, a carpenter employed at the Smokehouse mine, was instantly killed on Oct. 1, 1900 by falling off the bucket. He fell about 200 feet. The jury found that McDonald was intoxicated when he met his death.

S. L. Fuller, a miner employed at the Old Joe mine, was instantly killed by a cave of ground in the shaft on Oct. 11, 1900. The jury decided that the accident was unavoidable.

Dan Buckley, a miner employed at the Diamond, was instantly killed on Oct. 14, 1900 at a point in the shaft about 60 feet below the 700-ft level. Buckley and his partner were cleaning down the shaft when Buckley's head was caught between the cage and the wall plate. The jury found that the death was accidental.

CARBON COUNTY.

Birch Wilkins, a miner employed at the Gebo coal mine was instantly killed by a blast on Feb. 14, 1900, in the second south

entry. The jury found that it was an unavoidable accident.

Daniel H. Brooks, a miner employed at the Bridger mine was injured by a blast on Feb. 14 and died on Feb. 16, 1900. The accident occurred in room 16, Second South, while Brooks with his partner were going into the room. Brooks was in the lead and when he reached the breast a shot went off breaking through. The jury found that it was an unavoidable accident.

JEFFERSON COUNTY.

John W. Slater, a miner employed at the Eva May mine was instantly killed September 28, 1900, on the 500-foot level by a fall of rock. The jury found that it was an unavoidable accident.

GRANITE COUNTY.

Nelson LeClaire, a station tender employed at the Bi-Metallic mine was instantly killed April 23, 1900, by the cage. He forgot to lower the bonnet of the cage after taking down timbers and when he started up the bonnet caught in the guides. LeClaire was terribly mangled. The jury found that the accident was caused by his own carelessness.

GALLATIN COUNTY.

Olaf Anderson, a miner employed at the Mountain Side coal mine was almost instantly killed by a fall of coal on Sept. 25, 1900. The coroner's jury found that it was unavoidable.

MADISON COUNTY.

John Brown and J. Gries, two miners employed at the Clipper mine near Pony were instantly killed by drilling into a missed hole on Feb. 3, 1900. At the inquest it was shown that they were notified that there was a missed hole. The jury found that it was an unavoidable accident.

James Gaylor, a miner employed at the Kennet mine, was instantly killed by falling off the cage on Oct. 13. There was no one with him on the cage at the time. The jury decided that it was an unavoidable accident.

John Eagan, a miner employed at the Strawberry mine at

Pony was instantly killed on Nov. 18th, 1900, at 2 p. m. He was working in a raise when in someway he missed his footing and he fell away a distance of 180 feet; the coroner's jury found that it was accidental.

ACCIDENTS.

John McCarthy, St. Lawrence mine, December 3, 1899: Leg broken by car tipping over.

John Hart, St. Lawrence mine, Dec. 3: Fracture of left leg by drill machine turning over.

John Baum, Diamond mine, Dec. 7: Kicked by a mule and rib broken.

John O'Neill, St. Lawrence mine, Dec. 7, 1899: Fracture of right thigh by fall of ground.

John R. Griffin, Anaconda mine, December 7, 1899: Hand badly lacerated by being struck by a timber.

Patrick Bermingham, Anaconda mine, Dec. 9: One toe badly crushed by wheels of ore car.

Thos. Williams, Diamond mine, Dec. 11; Collar bone, one rib and right arm broken by being caught between the cage and the collar of the shaft.

F. A. Arnold, Anaconda mine, Dec. 17: Ankle badly sprained by stepping into a hole.

David Bell, Colusa-Parrot mine, Dec. 29: Badly lacerated by a premature explosion.

Patrick X. Sullivan, Never Sweat mine, Dec. 29: Severe injuries from being struck by a piece of falling rock and falling into an ore chute.

Tim McGuin, Anaconda mine, Jan. 14: Eyes badly injured by an explosion.

Lewis Hersted, Anaconda mine, Jan. 14: Eyes badly injured by an explosion.

John Lowney, High Ore mine, Jan. 18: Severely injured on head and badly sprained leg by fall of ground.

Thos. C. Williams, Grey Rock mine, Jan. 20: Skull fractured by a fall of ground on the tenth floor of the 1,400-foot level.

John Berry, Parrot mine, Jan. 22: One knee dislocated by falling through the floor.

Peter E. Delaney, Bell mine, Feb. 15: Ankle badly sprained by falling down an ore chute.

Thos. Hanratty, Diamond mine, Feb. 16: Sight of one eye destroyed and was badly lacerated by flying rock from an explosion.

Fred Huber, Diamond mine, Feb. 16: Sight of one eye destroyed and was badly lacerated by flying rock from an explosion.

Edward Morrow, Diamond mine, Feb. 16: Painful injuries received by flying rock from an explosion.

John Darnley, Carbon Coal Co., Feb. 22: Leg fractured by a fall of rock.

John Pierce, Rarus mine, March 7: Leg broken by a fall of rock.

Edward Shanahan, Moonlight mine, March 8: Ribs broken by a fall of rock.

Peter Foley, Dutton mine, March 17: Lost sight of both eyes by an explosion.

John Cranckovich, Parrot mine, March 24: Lost an arm.

August Stanga, Rocky Fork Coal Co., June 25: Body and scalp wounds by fall of roof.

Richard Walsh, Diamond mine, July 26: Arm broken and internal injuries from falling down a raise.

John Rande, Carbon Coal Co., July 28: Leg fractured by fall of roof.

Fred Trudo, Rarus mine, Aug. 7: Leg broken by drill machine falling on it.

J. T. McManus, Pennsylvania mine, Aug. 17: Both legs broken and internal injuries by a cave of ground.

Hester Heinai, Rocky Fork Coal Co., Sept. 15: Body bruised by a fall of coal.

John Thompson, Rocky Fork Coal Co., Sept. 16: Leg broken by a fall of coal.

Mike Chesko, Anaconda Copper Mining Co.'s Coal Mines, Sept. 22: Skull fractured by blast.

John Bergin, Carbon Coal Co., Oct. 10: Both bones of leg broken by a fall of coal.

F. L. Knott, Little Joe mine, Oct. 11: Leg broken by a cave of rock in shaft.

Jerry Crowley, Colusa-Parrot mine, Nov. 30: Serious injuries by a fall of ground.

